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*Citations from RSC ANALYTICAL ABSTRACT: AAN*

1. NDN 096-0012-6185-4: Separation of ionic species under supercritical water conditions.
2. NDN 096-0011-4061-3: Comparative assessment of accelerated leaching methods for on-site verification testing of special waste.
3. NDN 096-0008-8253-1: Effect of acid deposition on urban dew chemistry in Yokohama, Japan.
4. NDN 096-0005-7077-6: Food engineering residues: amino-acid composition of hydrolysates and application for the decontamination of metal polluted soils.
5. NDN 096-0005-3832-7: A novel sample introduction technique for combustion total organic carbon analysis in aqueous materials.

*Citations from BIO BUSINESS (BBS): BBS*

6. NDN 086-0093-3753-7: Influence of supplementing corn-soybean meal diets with vitamin E on performance and selected physiological traits of male turkeys
7. NDN 086-0081-6229-8: Effect of dietary linoleic to linolenic acid ratio and vitamin E supplementation on vitamin E status of poult

*Citations from Chemical Engineering Abstracts (CEA): CEA*

8. NDN 141-0033-4864-7: Degradation of 4-chlorophenol, 3,4-dichloroaniline, and 2,4,6-trinitrotoluene in an electrohydraulic discharge reactor.

*Citations from Conference Papers Index: CPI*

9. NDN 107-0034-4486-1: Determination of total organic carbon in natural waters by plasma emission spectrometry.

*Citations from Dissertation Abstracts: DIS*

10. NDN 135-0223-6094-0: PULSED POWER DISCHARGES IN WATER (WASTEWATER)

11. NDN 135-0210-5506-0: PHYSICO-CHEMICAL CHARACTERIZATION OF COLLOIDS IN RIVER WATER AND STUDIES OF EXPERIMENTAL CONDITIONS

12. NDN 135-0121-2379-8: TOTAL ORGANIC CARBON ANALYSIS BY INDUCTIVELY COUPLED PLASMA ATOMIC EMISSION SPECTROSCOPY

13. NDN 135-0111-0303-2: TRACE ELEMENT ANALYSIS OF MIOCENE LACUSTRINE MUDSTONES: CENTRAL TRANSVERSE RANGES, RIDGE BASIN, SOUTHERN CALIFORNIA

*Citations from Energy Science and Technology (DOE): EDB*

14. NDN 108-0673-1742-3: Electrochemical incineration of 4-chlorophenol and the identification of products and intermediates by mass spectrometry

15. NDN 108-0672-0833-6: Final report for tank 241-B-203, push mode cores 115, 120 and 122

16. NDN 108-0641-4327-6: In flight calcination of radioactive-waste simulant in a thermal plasma flow reactor

17. NDN 108-0638-1441-2: Final report for tank 241-U-203, push mode cores 79 and 80. Revision 1

-

18. NDN 108-0614-6761-7: Fundamental investigation of deep sea water. Part 1

19. NDN 108-0613-5492-6: Aqueous sample from B-Plant, Tank 9-1. Revision 1

*Citations from Energy Science and Technology (DOE): EDI*

20. NDN 168-0358-6883-5: Analysis of Rio Blanco 1 sour waters

*Citations from ENGINEERING INDEX: EI*

21. NDN 017-0197-3901-5: Submicron particles in the Rhine River - I. Physico-chemical characterization

22. NDN 017-0184-6247-2: Measurements of distribution properties of commercial extractants with ICP and TOC methods.

*Citations from Engineering Index (1983-1989): EI1*

23. NDN 163-0240-5307-5: Studies of distribution of commercial extractants between diluent and water.

*Citations from Geological Abstracts (GEOREF): GEO*

24. NDN 004-0344-3686-4: Composition and transformation of argillaceous cutans in soils as dependent on the character of gleyzation processes and parent rocks

25. NDN 004-0317-7421-7: Mineralogical and geochemical traits of the Egret Member oil source rock (Kimmeridgian), Jeanne d'Arc Basin, offshore Newfoundland, Canada

*Citations from INSPEC: INS*

26. NDN 174-0636-9718-7: The characterization of 0.1 μm LPD (light point defect) patterns in mass production of silicon wafer

*Citations from Life Sciences Collection (LSC): LSC*

27. NDN 122-0173-2382-3: Water-soluble prodrug of vitamin E for parenteral use and its effect on endotoxin-induced liver toxicity

28. NDN 122-0149-5759-0: Acetaminophen-induced hepatic injury in mice: The role of lipid peroxidation and effects of pretreatment with coenzyme Q<sub>10</sub> and alpha-tocopherol

*Citations from POLLUTION ABSTRACTS: PAB*

29. NDN 090-0025-2897-6: Trace Metal Levels in Chironomid Larvae and Sediments from a Bolivian River: Impact of Mining Activities

*Citations from Selected Water Resources Abstracts: WR1*

30. NDN 054-0014-1181-7: Nation-Wide Survey of the Chemical Composition of Drinking Water In Norway.

31. NDN 054-0008-6767-2: Toxicology of Natural and Man-Made Toxicants in Drinking Water.

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Citations from RSC ANALYTICAL ABSTRACT: AAN

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1. Separation of ionic species under supercritical water conditions.

AAN 61-10 AAN6110H00134 NDN- 096-0012-6185-4

Li, L. X.; Gloyna, E. F.

**JOURNAL NAME-** Separation Science and Technology

**VOL.** 34

**NO.** 6-7

Apr-May 1999

**PP.** 1463-1477

**DOCUMENT TYPE-** Journal

**ISSN-** 0149-6395

**CODEN-** SSTEDE

**AUTHOR AFFILIATION** - Univ. Texas, Environ. and Water Resources Eng. Program, Civil Eng. Dept., Austin, TX, USA

**SECTION CROSS-REFERENCE CODE-** B2

**SECTION CROSS-REFERENCE** - Chromatography and Electrophoresis, Supercritical-fluid technology

**CONFERENCE INFORMATION** - Presented at the Tenth Symposium on Separation Science and Technology for Energy Applications, held in Gatlinburg, TN, USA, 20-24 Oct 1997

**ORIGINAL LANGUAGE**- English

**LANGUAGE**- English

The method combined the oxidation of organic species and the precipitation of inorganic salts under SFE conditions. The feed liquid was waste water from nylon monomer manufacturing and contained 0.6% of NaOH, 2% of sodium borate and 3.6% of the sodium salts of C9 and C10 carboxylic acids and was pumped at 8-10 ml/min into the coiled reactor tube (6 m times 1.65 mm i. d.). Total organic carbon was determined with a commercial analyser, inorganic carbon was measured separately and Na and B were determined by ICP-AES. At 450 degree C and 24.1 MPa of H<sub>2</sub>O, the H<sub>2</sub>O, the oxygen and organic compounds formed a homogeneous solution; oxidation was rapid and efficient, with greater 99% conversion to CO<sub>2</sub>. Under these conditions, solubility of sodium salts, e. g., Na<sub>2</sub>CO<sub>3</sub>, was reduced to a few mg/l and they could be recovered. The B appeared in the effluent and could also be recovered.

**ANALYTE INDEX**- ions --sepn. of, in waste water, by supercritical-fluid technology

**CONCEPT INDEX**- technology, supercritical-fluid --extraction and oxidation, in waste water treatment

**MATRIX INDEX**- waste water --sepn. of ions from, by supercritical-fluid technology

**SECTION HEADING CODE**- H30000

**SECTION HEADING**- Environment, agriculture and food, Wastes

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## 2. Comparative assessment of accelerated leaching methods for on-site verification testing of special waste.

AAN 61-01 AAN6101H00129 NDN- 096-0011-4061-3

Maurer, A.; Frimmel, F. H.; Eitel, W.

**JOURNAL NAME**- Field Analytical Chemistry and Technology

**VOL.** 2

**NO.** 4

1998

PP. 195-203

DOCUMENT TYPE- Journal

ISSN- 1086-900X

CODEN- FACTFR

AUTHOR AFFILIATION- Univ. Karlsruhe, Dept. Water Chem., Engler-Bunte-Inst., 76131 Karlsruhe, Germany

SECTION CROSS-REFERENCE CODE- H4

SECTION CROSS-REFERENCE- Environment, agriculture and food, Sediments and soil

ORIGINAL LANGUAGE- English

LANGUAGE- English

Several accelerated leaching methods for the recovery of inorganic and organic pollutants from contaminated soil and water material were compared with the German standard method DIN 38 414-4. Standard soil and electroplating sludge samples were individually processed for 5 min by 7 different leaching methods (details tabulated) and for 24 h by the standard DIN method. Heavy metals (Cd, Cu, Ni) in the leachates were determined by ET AAS, Cl minus and SO 4 2 minus by ion chromatography and dissolved organic compounds by a TOC analyser. The results obtained (tables and histograms) showed that ultrasonic agitation or vortexing gave the best results (up to 85% of DIN recoveries). Microwave digestion was found to give anomalously high results due to enhanced dissolution of chelates present in the sludge. The ultrasonic method was tested further using five typical waste products (sludges, filter dust and soil contaminated with mineral oil). Heavy metals (Cd, Cu, Ni, Pb, Zn) in the leachates were measured by ICP MS, nitrite by spectrophotometry and dissolved organics by a TOC analyser. Recoveries within 20 min were shown to be 60-85% compared with the DIN results. RSD ( n = 3) were 8% and 5% for the sonication and DIN methods, respectively.

ANALYTE INDEX- pollutants --detmn. of, in contaminated soil and waste, leaching methods for

MATRIX INDEX- waste --detmn. of pollutants in, leaching methods for; soil --detmn. of pollutants in contaminated, leaching methods for

SECTION HEADING CODE- H30000

SECTION HEADING- Environment, agriculture and food, Wastes

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### 3. Effect of acid deposition on urban dew chemistry in Yokohama, Japan.

AAN 59-05 AAN5905H00059 NDN- 096-0008-8253-1

Okochi, H.; Kajimoto, T.; Arai, Y.; Igawa, M.

JOURNAL NAME- Bulletin of the Chemical Society of Japan

VOL. 69

NO. 11

1996-11

PP. 3355-3365

DOCUMENT TYPE- Journal

ISSN- 0009-2673

CODEN- BCSJA8

AUTHOR AFFILIATION- Kanagawa Univ., Fac. Eng., Kanagawa, Yokohama 221, Japan

**SECTION CROSS-REFERENCE CODE- A3****SECTION CROSS-REFERENCE-** General Analytical Chemistry, Sampling and sample preparation**ORIGINAL LANGUAGE-** English**LANGUAGE-** English

Dew or frost was collected on pieces (90 cm times 45 or 90 cm) of 0.1 mm thick PTFE sheet mounted with double-sided adhesive tape on 10 cm thick blocks of styrofoam and placed on the roof of a four-storey building. Before exposure, the sheet was rinsed with H<sub>2</sub>O and wiped with a paper tissue, and after exposure, deposit was scraped with a PTFE scraper into a PTFE bottle. The collected liquid was filtered through a 0.45 small  $\mu$ m pore membrane filter before analysis by ICP AES or ion chromatography or by use of a Shimadzu TOC analyser.

**CONCEPT INDEX-** samplers --for dew and frost**MATRIX INDEX-** frost --analysis of, samplers for; dew --analysis of, samplers for**SECTION HEADING CODE-** H20000**SECTION HEADING-** Environment, agriculture and food, Water

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**4. Food engineering residues: amino-acid composition of hydrolysates and application for the decontamination of metal polluted soils.**

AAN 57-04 AAN5704H00114 NDN- 096-0005-7077-6

Fischer, K.; Riemschneider, P.; Bieniek, D.; Kottrup, A.

**JOURNAL NAME-** Fresenius' J. Anal. Chem.**VOL.** 350**NO.** 7-9

Nov 1994

**PP.** 520-527**DOCUMENT TYPE-** Journal Article

ISSN- 0937-0633

**CODEN-** FJACES**CORPORATE AUTHOR-** GSF Forschungszentrum Inst. Oekol. Chem.**ADDRESS-** 85764 Oberschleissheim

Germany

**LANGUAGE-** English

Brewery residues and meat and slaughtering offal were analysed for total N and C content using an elemental analyser and a TOC analyser, respectively. The samples were hydrolysed in a Behrotest sample digestion unit with 6M-HCl at 110 degree C for 24 h. After filtering, the filtrate was analysed by ion chromatography on a column (15 cm.times. 4 mm i.d.) of fully sulfonated sodium cation-exchange poly(styrene-divinyl benzene) (5. $\mu$ m) with a 8. $\mu$ m particle size guard column (2 cm.times. 3 mm i.d.) at 50 degree C with gradient elution (0.4 ml/min; details given) of Pickering buffer solutions of pH 3.15 and 7.4 and 0.2M-NaOH. The eluate was mixed with o-phthaldehyde reagent in a reaction coil (no details given) for fluorescence detection at 455 nm (excitation 340 nm). Fifteen amino-acids and ammonia were detectable from 0.5-20. $\mu$  M. Metal concentrations of the hydrolysates and soil extracts were measured by ICP AES. The leaching capacities of the hydrolysates were examined by batch testing with contaminated soil and results are discussed.

**ANALYTE INDEX** - amino-acids --detmn. of, in waste brewery materials and waste offal, by ion-exchange chromatography

**CONCEPT INDEX** - chromatography, ion-exchange --in organic industrial analysis; chromatography, ion-exchange --in environmental analysis; chromatography, ion-exchange --in food analysis

**MATRIX INDEX** - offal --detmn. of amino-acids in waste, by ion-exchange chromatography; brewing materials --detmn. of amino-acids in waste, by ion-exchange chromatography; waste --detmn. of amino-acids in brewing materials and offal, by ion-exchange chromatography

**SECTIONAL CLASSIFICATION CODE** - H30000

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**5. A novel sample introduction technique for combustion total organic carbon analysis in aqueous materials.**

AAN 57-02 AAN5702D00138 NDN- 096-0005-3832-7

Winnett, W. K.; Murphy, M. P.

**JOURNAL NAME**- Talanta

**VOL.** 41

**NO.** 10

Oct 1994

**PP.** 1627-1630

**DOCUMENT TYPE** Journal Article

**ISSN**- 0039-9140

**CODEN**- TLNTA2

**CORPORATE AUTHOR**- Dow Chem. USA

**ADDRESS**- Freeport, TX 77541

USA

**LANGUAGE**- English

A modification for combustion total organic carbon ( TOC ) analysers is presented where the sample is sprayed into the combustion region. The nebulizer spray used was created by a glass pneumatic nebulizer used in ICP AES with a Ni foil liner to protect the combustion tube from thermal shock by the spray. thermally created sprays and nebulizer sprays are discussed. Spray introduction gave more symmetric signals, less effective noise and less signal tailing than conventional drip sample introduction.

**CAS REGISTRY/EC NUMBER(S)**- 7440-44-0

**ANALYTE INDEX**- carbon --detmn. of total organic, instrument for

**SECTIONAL CLASSIFICATION CODE**- D30000

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Citations from BIO BUSINESS (BBS): BBS

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**6. Influence of supplementing corn-soybean meal diets with vitamin E on performance and selected physiological traits of male turkeys**

BBS 97-44 0940456 NDN- 086-0093-3753-7

Sell, J. L.; Soto-Salanova, M. F.; Palo, P.; Jeffrey, M.

**JOURNAL NAME-** Poultry Science

Vol. 76, No. 10, p. 1405-1417

1997

**DOCUMENT TYPE-** Article**ISSN-** 0032-5791**CORPORATE AUTHOR-** Dep. Anim. Sci., 201 Kildee Hall, Iowa State Univ., Ames, IA 50011-3150,  
USA**SPECIAL FEATURE(S)-** NONUNIQUE**LANGUAGE-** English

Three experiments were conducted to determine the effects of supplementing practical diets of male turkeys with dl-alpha-tocopheryl acetate (TA). In Experiment 1, a factorial arrangement of dietary treatments (0, 12, 50, 150, and 300 IU TA/kg with 0 or 300 mg ascorbic acid (AA)/kg) was used. These 10 treatments were fed to poulets from 1 to 41 d of age. From 41 to 118 d of age, the AA treatments were discontinued, and the 300 IU TA treatment groups were changed to 12 IU TA/kg. Neither TA nor AA treatments affected 41-d BW, feed to gain ratio (FE), or livability. No effects of dietary TA concentrations on turkey performance were observed through 118 d of age. alpha-Tocopherol (TOC) concentrations of plasma and livers were increased by increments of dietary TA, with substantial liver storage when toms were fed 150 IU TA/kg from 1 to 118 d. Supplementing diets with 0, 25, 50, 75, or 100 IU TA/kg in Experiments 2 and 3 had no effect on performance of toms through 119 and 105 d, respectively. alpha Tocopherol concentrations of plasma and red blood cells (RBC) increased linearly with increments of dietary TA. The same was true for livers in Experiment 2. Susceptibility of RBC to hemolysis induced by 400 mu-M t-butyl hydroperoxide (TBH) in Experiment 2 decreased with increasing dietary TA, and these decreases corresponded to increases in TOC concentration of RBC. However, the relationships between hemolysis and dietary TA or RBC TOC were inconsistent in Experiment 3 and varied according to concentration of TBH (200, 300, or 400 mu-M) and age of the toms. At 105 d of age, RBC of toms fed no supplemental TA were resistant to hemolysis, irrespective of dietary TA and TBH concentration. In Experiment 3, there were no indications of dietary TA effects on plasma peroxide concentration or activity of plasma creatine kinase. A positive relationship between dietary TA and blastogenic responses of blood lymphocytes was observed with concanavalin A when toms were at 44 d but not at 23 or 86 d of age. The overall data indicate that corn-soybean meal diets containing from 6 to 20 IU TOC/kg, but no supplemental TA supported satisfactory performance and well-being of male turkeys from 1 d of age to market ages when the turkeys were free of disease, as was true in the research reported here.

**DESCRIPTOR(S) -** ALPHA-TOCOPHEROL; ANIMAL HUSBANDRY; BIRD; BLOOD AND LYMPHATICS; CORN-SOYBEAN MEAL DIETS; DIETARY SUPPLEMENT; HEMOLYSIS; MALE; PLASMA; POULTRY INDUSTRY; RED BLOOD CELL; RESEARCH ARTICLE; SELECTED PHYSIOLOGICAL TRAITS; TISSUE CONCENTRATION; TURKEY; VITAMIN E**CONCEPT CODE(S) -** 01100, POULTRY PRODUCTION-GENERAL & METHODS; 04100, BIOCHEMISTRY & CHEMISTRY-GENERAL; 15100, BLOOD & RELATED TOPICS; 20100, NUTRITION

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## 7. Effect of dietary linoleic to linolenic acid ratio and vitamin E supplementation on vitamin E

**status of pouls**

BBS 96-32 0822932 NDN- 086-0081-6229-8

Applegate, T. J.; Sell, J. L.

**JOURNAL NAME- Poultry Science**

Vol.75, No.7, P.881-890

1996

**ISSN-** 0032-5791**CORPORATE AUTHOR-** Dep. Anim. Sci., Iowa State Univ., 201 Kildee Hall, Ames, IA 50011-3150,  
USA**SPECIAL FEATURE(S)- NONUNIQUE****LANGUAGE- ENGLISH**

Two experiments were conducted to determine the effect of dietary linoleic to linolenic acid (LO:LN) ratio and dl-alpha-tocopheryl acetate (TA) supplementation on selected characteristics of the liver and cerebellum and on vitamin E status of turkey pouls from hatch through 22 d of age. In Experiment 1, 1-d-old pouls were fed diets containing no supplemental TA (0E) or 150 IU TA/kg diet (150E). Pouls fed the 150E diet had greater ( $P < 0.001$ ) concentrations of alpha-tocopherol (TOC) in the liver and plasma than those fed the 0E diet from 7 to 22 d of age. The 150E diet, however, did not completely overcome the decrease in liver and plasma TOC concentrations observed at these ages. The 150E diet had no effect on poult BW, feed efficiency, or on the weight, protein, lipid, or fatty acid concentrations of the liver. Thiobarbituric acid reactive substances assay of Liver and hemolysis assay of red blood cells (RBC) showed that the 150E diet decreased the susceptibility of liver and RBC to in vitro peroxidation at 13 and 22 d of age. In Experiment 2, 1-d-old pouls were fed the 0E and 150E diets in a complete factorial arrangement with decreasing ratios of LO:LN (10, 5, and 1). Dietary LO:LN ratio had no effect on RBC hemolysis or cerebellum TOC concentration. As the ratio of LO:LN decreased, the arachidonic acid content of Liver and cerebellum lipids decreased. Ratios of n-6 to n-3 fatty acids in liver and cerebellum were directly related to dietary LO:LN at 13 and 22 d of age.

**DESCRIPTOR(S) -** BIRD; CHICKEN; FEEDING; METABOLISM; POULTRY INDUSTRY;  
RESEARCH ARTICLE**CONCEPT CODE(S)-** 01200, POULTRY PRODUCTION-FEEDS & FEEDING; 04300, LIPIDS &  
RELATED COMPOUNDS; 04800, VITAMINS; 20100, NUTRITION; 20200, DIETARY STUDIES

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Citations from Chemical Engineering Abstracts (CEA): CEA

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**8 . Degradation of 4-chlorophenol, 3,4-dichloroaniline, and 2,4,6-trinitrotoluene in an electrohydraulic discharge reactor.**

CEA 28-01 CEB2801001266 NDN- 141-0033-4864-7

Willberg, D. M.; Lang, P. S.; Hoechmer, R. H.; Kratel, A.; Hoffmann, M. R.

**JOURNAL NAME- Environmental Science and Technology****VOL. 30****NO. 8**

1996

PP. 2526-2534

**DOCUMENT TYPE-** Journal

ISSN- 0013-936X

**CODEN-** ESTHAG

**AUTHOR AFFILIATION-** California Inst. of Technol., Pasadena CA 91125, USA

**SECTION CROSS-REFERENCE CODE-** 36; 43

**SECTION CROSS-REFERENCE -** Chemical Reactor Engineering; Chemical Reactor Engineering; Economics/Optimization

**LANGUAGE OF ABSTRACT-** English

**ORIGINAL LANGUAGE-** English

**LANGUAGE-** English

In this electrohydraulic discharge (EHD) system, energy stored in large capacitors is released between two electrodes submerged in wastewater, resulting in a high-temperature (over 14,000 K) plasma channel that emits uv radiation and produces a shockwave. In this study with 4-chlorophenol, 3,4-dichloroaniline and 2,4,6-trinitrotoluene (TNT), the initial rates of degradation are described by  $dC/dN = -k_1 C_i - k_0$ , where  $dC/dN$  is the change in concentration per discharge,  $C_i$  is the initial substrate concentration,  $k_0$  is the zero-order term that accounts for direct photolysis, and  $k_1$  is the first-order term that accounts for oxidation in the immediate region of the plasma channel. Ozone increases the rate and extent of substrate degradation; combined EHD/ozone treatment of 160 microM TNT completely degraded the TNT and decreased total organic carbon by 34%. (MacMillan)

**DESCRIPTOR(S)-** kinetics photolysis; oxidation; plasma reactor; waste water treatment

**SECTIONAL CLASSIFICATION CODE-** 352; 124; 127; 5823

**SECTION HEADING CODE-** 35

**SECTION HEADING-** Kinetics and Thermodynamics

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Citations from Conference Papers Index: CPI

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**9. Determination of total organic carbon in natural waters by plasma emission spectrometry.**

CPI 76-01 NO-ACCESSION 76010324 NDN- 107-0034-4486-1

Canelli, E.

**AUTHOR AFFILIATION-** NYS Dept Of Health, New Scotland Ave, Albany, NY 12201.

**SPONSORING AGENCY-** Federation of Analytical Chemistry and Spectroscopy Societies

**CONFERENCE DATE-** 6-10 Oct 75

**CONFERENCE TITLE-** Federation of Analytical Chemistry and Spectroscopy Societies 2nd National Meeting

**CONFERENCE LOCATION-** Indianapolis, Indiana

**ISSUE OF ORIGINATION-** v4n2

**LANGUAGE-** English (DEF)

NO-ABSTRACT

**descriptor(s)** - CARBON; DETERMINATION; EMISSION; ORGANIC; PLASMA;  
SPECTROMETRY; WATER  
**Identifier(s)**- NATURAL; TOTAL  
**CPI Registry Number**- A754023  
**Sectional Classification Code**- 2500

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Citations from Dissertation Abstracts: DIS

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**10. PULSED POWER DISCHARGES IN WATER (WASTEWATER)**  
DIS 96-09 AAI9630802 NDN- 135-0223-6094-0

KRATEL, AXEL WOLF HENDRIK  
Adviser: MICHAEL HOFFMANN

**VOL.** 57-05B

1996

**PP.** 3355

182 page(s)

**CORPORATE AUTHOR**- CALIFORNIA INSTITUTE OF TECHNOLOGY

**INSTITUTION CODE**- 0037

**Degree**- PH.D.

**SUBFILE CODE**- DAI

**Document Order Number**- AAI9630802

**Section**- The Sciences and Engineering

**LANGUAGE**- English (DEF)

An Electrohydraulic Discharge Process (EHD) for the treatment of hazardous chemical wastes in water has been developed. Liquid waste in a 4 L EHD reactor is directly exposed to high-energy pulsed electrical discharges between two submerged electrodes. The high-temperature ( $>14,000$  K) plasma channel created by an EHD discharge emits ultraviolet radiation, and produces an intense shock wave as it expands against the surrounding water. A simulation of the EHD process is presented along with experimental results. The simulation assumes a uniform plasma channel with a plasma that obeys the ideal gas law and the Spitzer conductivity law. The results agree with previously published data. The simulation is used to predict the total energy efficiency, energy partitioning, maximum plasma channel temperature and pressure for the Caltech Pulsed Power Facility (CPPF). The simulation shows that capacitance, initial voltage and gap length can be used to control the efficiency of the discharge. The oxidative degradation of 4-chlorophenol (4-CP), 3,4-dichloroaniline (3,4-DCA), and 2,4,6 trinitrotoluene (TNT) in an EHD reactor was explored. The initial rates of degradation for the three substrates are described by a first-order rate equation, where  $k_{sb}\{it 0V\}$  is the zero-order rate constant that accounts for direct photolysis; and  $k_{sb}\{it 1V\}$  is the first-order term that accounts for oxidation in the plasma channel region. For 4-CP in the 4.0 L reactor, the values of these two rate constants are  $k_{sb}\{it 0V\} = 0.73 \text{ pm} 0.08 \mu\text{M}$ , and  $k_{sb}\{it 1V\} = (9.4 \text{ pm} 1.4) \times 10^{-4}$ . For a 200  $\mu\text{M}$  4-CP solution this corresponds to an overall intrinsic zero-order rate constant of  $0.022 \text{ M}^{-1} \text{ s}^{-1}$ , and a G-value of  $4.45 \times 10^{-3}$ . Ozone increases the rate and extent of degradation of the substrates in the EHD reactor. Combined EHD/ozone treatment of a 160  $\mu\text{M}$  TNT solution resulted in the complete degradation of

TNT, and a 34% reduction of the total organic carbon ( TOC ). The intrinsic initial rate constant of TNT degradation was 0.024 M  $s^{-1}V^{-1}$ . The results of these experiments demonstrate the potential application of the EHD process for the treatment of hazardous wastes.

**DESCRIPTOR(S)- ENGINEERING, ENVIRONMENTAL  
SECTIONAL CLASSIFICATION CODE- 0775; 0768; 0759, 0543**

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## **11. PHYSICO-CHEMICAL CHARACTERIZATION OF COLLOIDS IN RIVER WATER AND STUDIES OF EXPERIMENTAL CONDITIONS**

DIS 94-11 AAIC377863 NDN- 135-0210 5506 0

CHEN, YUWEI

**VOL. 55-04C**

1993

**PP. 1204**

200 page(s)

**CORPORATE AUTHOR- UNIVERSITE DE GENEVE (SWITZERLAND)**

**INSTITUTION CODE- 5823**

**Degree- D.SC.**

**SUBFILE CODE- DAI**

**Document Order Number- AAIC377863**

**Section- European Abstracts**

**LANGUAGE- English (DEF)**

The storage conditions of colloidal samples of river water were systematically studied by means of light scattering (LS), photon correlation spectroscopy (PCS), transmission electron microscopy (TEM) and plate counting agar (PCA) techniques. We showed that after 3 days, significant changes of the colloidal system occurred due to coagulation and biodegradation. Any addition of preservatives ( $Hg^{2+}$ ,  $NaN_3$  and  $(NaPO_4)_2$ ) not only disturbs the natural system, but also interferes with later analyses. A maximum 3-day storage at  $7^\circ C$  in the dark is acceptable. Particle fractionation operation conditions and procedures were established. A 2h-sedimentation (in an isothermal tank) separates 60-80% (in mass) of larger particles ( $\Phi \geq 2 \mu m$ ,  $d = 2.7$ ) from the top 1.0-2.5cm. The collected supernatant was submitted to a cascade centrifugation (4 steps) and filtration (2 steps) parallelly at  $7^\circ C$  in the dark. A slow flow-rate minimizes clogging in filtration. We proved by PCS, TEM and PCA analyses that stirring during filtration accelerates coagulation and causes drastic bacterial proliferation. The potential of bacterial contamination from unsterilized analytical pure water was also studied. A 1-yr study of particles and submicron particles in the Rhine River was done using LS, PCS, TEM, SEM, ICP, TOC and gravimetry analyses. The total particle mass concentration was low:  $\sim 10 mg/L$ . Particles  $>1 \mu m$  represented  $\sim 88\%$  of the total mass, but particles  $<1 \mu m$  were present in larger numbers, thus had larger reactive surface. ICP and TEM analyses showed that larger particles were mainly composed of sands, clay detritus and calcites. ICP analyses also revealed a higher mass % of Fe, Mn and Al containing particles in the fractionated samples than in the raw samples. Particles  $\leq 1 \mu m$  were classified into  $0.7-1.0 \mu m$ ,  $0.2-0.7 \mu m$  and  $\leq 0.2 \mu m$  ranges, 4%, 10% and 1% in mass, respectively. However their reactive adsorbing sites are significantly higher than those of larger particles. A classical coagulation/sedimentation model was used to predict particle distribution and the level of agreement between the model and field observation was discussed.

**DESCRIPTOR(S)- CHEMISTRY, ANALYTICAL  
SECTIONAL CLASSIFICATION CODE- 0486**

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**12. TOTAL ORGANIC CARBON ANALYSIS BY INDUCTIVELY COUPLED PLASMA  
ATOMIC EMISSION SPECTROSCOPY**  
DIS 93-23-BK AAI1347655 NDN- 135-0121-2379-8

BONDAROWICZ, JOHN FRANK  
Adviser: SEYMOUR PATINKIN

**VOL.** 30-04

1992

**PP.** 1331

80 page(s)

**CORPORATE AUTHOR- ROOSEVELT UNIVERSITY  
INSTITUTION CODE- 1137**

**Degree-** M.S.

**SUBFILE CODE-** MAI

**Document Order Number-** AAI1347655

**LANGUAGE-** English (DEF)

Low level analysis of organic carbon has been traditionally ignored by ICP analysts. Unacceptably high levels of carbon background make accurate low level carbon determinations by the ICP difficult. In addition, the standard ICP sample introduction device, pneumatic nebulization, differentiates organic species according to their physical properties (surface tension, volatility) making accurate determinations of total organic carbon at any concentration impossible. These two obstacles have made accurate low level organic carbon analysis by the standard ICP methodology impossible. A novel method of accurately determining low level organic carbon by the ICP has been developed in this work. A relatively simple modification of the sample introduction device overcomes the high carbon background by tremendously increasing sample transport efficiency and eliminating organic species differentiation problems. Detection limits are equivalent to the commercial TOC methods with the potential of further performance improvements, in this new method, easily attainable.

**DESCRIPTOR(S)- CHEMISTRY, ANALYTICAL  
SECTIONAL CLASSIFICATION CODE- 0486**

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**13. TRACE ELEMENT ANALYSIS OF MIocene LACustrine MUDSTONES: CENTRAL  
TRANSVERSE RANGES, RIDGE BASIN, SOUTHERN CALIFORNIA**  
DIS 93-21-BK AAI0571158 NDN- 135-0111-0303-2

KENNEDY, M. ELAINE  
Chairman: ROBERT H. OSBORNE

**VOL. 52-09B**

1991

**PP. 4641****CORPORATE AUTHOR- UNIVERSITY OF SOUTHERN CALIFORNIA****INSTITUTION CODE- 0208****Degree- PH.D.****SUBFILE CODE- DAI****Document Order Number- AAI0571158****Section- The Sciences and Engineering****LANGUAGE- English (DEF)**

The source rocks and source areas as well as the pH and Eh conditions for interstitial water at the time of deposition were determined for 154 samples assigned to the Cereza Peak Shale Member of the Miocene Peace Valley Formation and associated units (Piru Gorge Sandstone Member of the Ridge Route Formation, Violin Breccia and Liebre Massif) exposed in Ridge Basin, California. Information was obtained by x-ray fluorescence analysis of the following 14 trace elements: barium, chromium, hafnium, lanthanum, lead, nickel, thorium, uranium, yttrium, strontium, rubidium, niobium, gallium and zirconium. These data were augmented by Fourier transform infrared (FTIR) analysis ( $n = 20$ ), x-ray diffraction (XRD) analysis ( $n = 20$ ) and inductively coupled plasma atomic emission (ICPAE) analysis ( $n = 12$ ). Bivariate plots, computation of the correlation coefficient ( $r$ ), 2-way analysis of variance and the Duncan new multiple range test employed to reduce the resultant data. The following evidence suggests a northeastern source area (Liebre Massif) for the Cereza Peak mudstone samples: (1) Cr is highly correlated with clay content ( $r = 0.96$ ) and values for the Cr:clay ratio are constant basinward from the northeast, (2) Cr, Nb, Ni, Rb, U and Zr values are similar for the Cereza Peak and northeastern-sourced Piru Gorge mudstone samples; however, values for mudstones from the southwestern-sourced Violin Breccia are as much as 2.5 times greater, (3) average La:Th ratios of 3.2 and 3.4 as well as average Hf values of 3.0 and 4.3 ppm for Cereza Peak and Piru Gorge samples, respectively, also indicate a close genetic affinity. These values are consistent with those from granitic samples from the Liebre Massif (La:Th ratio = 2.7; Hf = 3.4 ppm), but contrast sharply with samples from the Violin Breccia (La:Th = 4.7; Hf = 6.6 ppm). Values for V:Ni and Th:U ratios, low calcium and pyrite contents, and low TOC values for the Cereza Peak samples suggest slightly acidic, dysaerobic, reducing conditions for the interstitial water during deposition of the muds. This research demonstrates that La:Th ratios in conjunction with Hf values may be used to determine source areas and source rocks. V:Ni ratios may be used to measure pH and Eh conditions in paleolacustrine mudstones. (Copies available exclusively from Micrographics Department, Doheny Library, USC, Los Angeles, CA 90089-0182.)

**DESCRIPTOR(S)- GEOLOGY****SECTIONAL CLASSIFICATION CODE- 0372**

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Citations from Energy Science and Technology (DOE): EDB

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**14. Electrochemical incineration of 4-chlorophenol and the identification of products and intermediates by mass spectrometry**

EDB 99-19 99:084668 99002126136 NDN- 108-0673-1742-3

Johnson, S. K.; Houk, L. L.; Feng, J.; Houk, R. S.; Johnson, D. C., (Ames Lab., Ames, IA (United

States))

**JOURNAL NAME-** Environmental Science and Technology

**VOL.** 33

**NO.** 15

1999-08-01

**PP.** 2638-2644

**DOCUMENT TYPE-** Journal Article

**ISSN-** 0013-936X

**CODEN-** ESTHAG

**AUTHOR AFFILIATION-** Ames Lab., Ames, IA (United States)

**LOCATION OF WORK- US**

**SPONSORING AGENCY-** USDOE, Washington, DC (United States)

**CONTRACT/GRANT NUMBER-** DOEW-7405-ENG-82

**SUBFILE CODE-** IMS

**PUBLICATION COUNTRY- US**

**ANNOUNCEMENT CODE-** EDB; ETD

**SPONSORING ORGANIZATION CODE(S)-** DOE

**INCOMING TAPE SERIAL NUMBER-** IM9938%132

**ANNOUNCEMENT IDENTIFICATION-** EDB-99:084668

**LANGUAGE-** English

This report summarizes results obtained as part of a larger effort to demonstrate the applicability of electrolytic procedures for the direct anodic (oxidative) degradation of toxic organic wastes. The authors refer to this process as electrochemical incineration (ECI) because the ultimate degradation products are equivalent to those achieved by thermal incineration processes. In this work, the ECI of 4-chlorophenol is achieved in an aqueous medium using a platinum anode coated with a quaternary metal oxide film containing Ti, Ru, Sn, and Sb oxides. The electrode is stable and active when used with a solid Nafion membrane without the addition of soluble supporting electrolyte. Liquid chromatography (LC), including reverse phase and ionexchange chromatography, is coupled with electrospray mass spectrometry (ES-MS) and used, along with gas chromatography-mass spectrometry (GC-MS) and measurements of pH, chemical oxygen demand (COD), and total organic carbon (TOC), to study the reaction and identify the intermediate products from the ECI of 4-chlorophenol. Twenty-six intermediate products are identified and reported. The most abundant of these products are benzoquinone, 4-chlorocatechol, maleic acid, succinic acid, malonic acid, and the inorganic anions chloride, chlorate, and perchlorate. After 24 h of ECI, a solution that initially contained 108 ppm 4-chlorophenol yields only 1 ppm TOC with 98% of the original chlorine remaining in the specified inorganic forms. LC-ES-MS and direct infusion ES-MS detection limits are between 80 ppb and 4 ppm for these intermediate products. Elemental analysis of the electrolyzed solutions by inductively coupled plasma mass spectrometry ICP-MS showed that only trace amounts of the metallic elements comprising the metal oxide film were present in the solution.

**DESCRIPTOR(S)-** CHLORINATED AROMATIC HYDROCARBONS; COMBUSTION; ELECTROCHEMISTRY; INCINERATORS; INDUSTRIAL WASTES; MASS SPECTROSCOPY; PERFORMANCE; WASTE PROCESSING; WASTE WATER IDENTIFIER(S)- AROMATICS; CHEMICAL REACTIONS; CHEMISTRY; HALOGENATED AROMATIC HYDROCARBONS; HYDROGEN COMPOUNDS; LIQUID WASTES; MANAGEMENT; ORGANIC CHLORINE COMPOUNDS; ORGANIC COMPOUNDS; ORGANIC HALOGEN COMPOUNDS; OXIDATION; OXYGEN COMPOUNDS; PROCESSING; SPECTROSCOPY; THERMOCHEMICAL PROCESSES; WASTE MANAGEMENT; WASTES; WATER

**SECTIONAL CLASSIFICATION CODE-** 320305

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**15. Final report for tank 241-B-203, push mode cores 115, 120 and 122**  
EDB 99-17 99:073759 99002041917 NDN- 108-0672-0833-6

Jo, J..(M).

1996-04-08

1345 page(s)

**DOCUMENT TYPE-** Report

**CORPORATE AUTHOR-** Fluor Daniel Hanford Inc., Richland, WA (United States)

**LOCATION OF WORK-** US

**SPONSORING AGENCY** - USDOE Office of Environmental Restoration and Waste Management, Washington, DC (United States)

**MEDIUM**- 1782, JO, J., 509-373-9322 (UNITED STATES)

**CONTRACT/GRANT NUMBER**- DOEAC06-96RL13200

**REPORT NUMBER(S)**- WHC-SD-WM-DP--169-Rev.1

**SUBFILE CODE**- IMS

**PUBLICATION COUNTRY**- US

**ANNOUNCEMENT CODE**- EDB; ETD; INS; NTS

**Document Order Number**- DE99050378

**SPONSORING ORGANIZATION CODE(S)**- DOE/EM

**INCOMING TAPE SERIAL NUMBER**- AHC29926%31

**ANNOUNCEMENT IDENTIFICATION**- HNF-98:96000285; ELC-98351; EDB-99:073759

**LANGUAGE**- English

This is the final laboratory report for tank 241-B-203 (B-203), cores 115, 120 and 122. Two fourteen-segment and one eleven-segment push-mode core samples from tank B-203 and a field blank sample were received at the 222-S Laboratory. Cores 115 (11 segments) and 120 (14 segments) were obtained from riser 2 and core 122 (14 segments) was obtained from riser 7. Core 115 was archived due to poor sample recovery and not analyzed (with an exception of liner liquid). The other two core samples underwent safety screening analyses in accordance with the sampling and analysis plan, differential scanning calorimetry (DSC), thermogravimetric analysis (TGA), total alpha analysis, and bulk density measurements. Bromide analysis by ion chromatography (IC) and lithium analysis by inductively coupled plasma atomic emission spectroscopy ( ICP ) were performed to determine if the samples were contaminated with any lithium bromide solution that may have been used during sampling. Total organic carbon ( TOC ) and cyanide (CN) analyses were completed for two samples with high exotherms. In addition to the core sample analysis, the tank headspace flammability was measured prior to core sampling as required by the SAP and Safety Screening DQO. None of the data indicate that the tank is unsafe when compared to the criteria in the Safety Screening Data Quality Objective. The tank has a high moisture content (approximately 75%). Two samples exceeded the DSC notification limit. However, re-analysis of these samples could not reproduce the same results (no exotherms detected). Also, secondary TOC and CN analyses on these samples indicated negligible fuel content. The one-sided 95-percent confidence intervals for total alpha results are well below the notification limit. Furthermore, the vapor in the tank B-203 dome space is far below the 25% lower flammability limit (LFL) stated in the SAP. Therefore, the results show that this tank may be considered safe. Water with a lithium bromide tracer, was used to flush the drill bit (when plugged) during the sampling of this tank. However, no mention of water usage was recorded on the chain of custody forms which accompanied the samples to the laboratory, and consequently no lithium bromide solution blank was taken. The lithium bromide solution blank data from

the tank 241-B-204 sampling event was used for comparison. The results indicates very small amounts of contamination (less than 2 percent) in the samples by the lithium bromide solution. Therefore, no adjustments were made for the TGA results.

**DESCRIPTOR(S)-** CHEMICAL COMPOSITION; CYANIDES; FLAMMABILITY; HANFORD RESERVATION; ORGANIC COMPOUNDS; RADIOACTIVE WASTES; RADIOISOTOPES; SAMPLING; STORAGE FACILITIES      **IDENTIFIER(S)-** COMBUSTION PROPERTIES; ISOTOPES; MATERIALS; NATIONAL ORGANIZATIONS; RADIOACTIVE MATERIALS; US DOE; US ERDA; US ORGANIZATIONS; WASTES

**SECTIONAL CLASSIFICATION CODE-** 052002

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**16. In flight calcination of radioactive-waste simulant in a thermal plasma flow reactor**

EDB 97-07 97:039030 97001756992 NDN- 108-0641-4327-6

Taylor, P. R.; Manrique, M.; Pirzada, S. A., (Univ. of Idaho, Moscow, ID (United States)); and others  
**EDITOR-** Ramachandran, V.; Nesbitt, C. C.

1996

**PP.** 153-166

870 page(s)

**DOCUMENT TYPE-** Book Analytic

**MONOGRAPH TITLE-** Second international symposium on extraction and processing for the treatment and minimization of wastes 1996

**AUTHOR AFFILIATION-** Univ. of Idaho, Moscow, ID (United States)

**LOCATION OF WORK-** US

**LITERARY INDICATOR(S)-** Conference

**REPORT NUMBER(S)-** CONF-961018--

**SUBFILE CODE-** IIA

**PUBLISHER-** Minerals, Metals & Materials Society

**PUBLICATION PLACE-** Warrendale, PA (United States)

**PUBLICATION COUNTRY-** US

**CONFERENCE DATE-** 27-30 Oct 1996

**CONFERENCE TITLE -** Minerals, Metals and Materials Society (TMS) fall extraction and process metallurgy meeting

**CONFERENCE LOCATION-** Scottsdale, AZ (United States)

**ANNOUNCEMENT CODE-** EDB; ETD; INS

**INCOMING TAPE SERIAL NUMBER-** 97:000327-0005

**ANNOUNCEMENT IDENTIFICATION-** EDB-97:039030

**LANGUAGE-** English

This investigation studied the inflight calcination kinetics of nuclear waste stimulant using a thermal plasma reactor. A series of experiments were performed to determine the conversion of insoluble aluminum compounds to the soluble compounds and the decomposition of complex organic and nitrite compounds present in the stimulant waste. Thermodynamic calculations based on free energy minimization were performed to establish a theoretical basis for this investigation. A kinetic model to describe the conversion of gibbsite to sodium aluminate has been proposed. The products of the calcination were characterized using XRD, Gas Chromatography, and chemical analysis by ICP. The results of this

investigation indicated 85% gibbsite conversion to sodium aluminate, 90% of nitrate decomposition, 52% TOC decomposition and 90% conversion of chromium to soluble compounds. A process is identified for inflight calcination of wastes. 15 refs., 10 figs., 2 tabs.

**DESCRIPTOR(S)** - \*ALUMINIUM COMPOUNDS --Solubility; \*RADIOACTIVE WASTES --Calcination; \*RADIOACTIVE WASTES --Plasma heating CHEMICAL REACTION KINETICS, RADIOACTIVE WASTE PROCESSING IDENTIFIER(S)- CHEMICAL REACTIONS, DECOMPOSITION; HEATING; KINETICS; MANAGEMENT; MATERIALS; PROCESSING, PYROLYSIS; RADIOACTIVE MATERIALS, RADIOACTIVE WASTE MANAGEMENT; REACTION KINETICS; THERMOCHEMICAL PROCESSES; WASTE MANAGEMENT; WASTE PROCESSING; WASTES

**SECTIONAL CLASSIFICATION CODE**- 052001

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**17. Final report for tank 241-U-203, push mode cores 79 and 80. Revision 1**  
EDB 97-02 97:006110 97001709564 NDN- 108-0638-1441-2

Schreiber, R. D..(M).

1995-10-31

174 page(s)

**DOCUMENT TYPE**- Report

**CORPORATE AUTHOR**- Westinghouse Hanford Co., Richland, WA (United States)

**LOCATION OF WORK**- US

**SPONSORING AGENCY** - USDOE Office of Environmental Restoration and Waste Management, Washington, DC (United States)

**CONTRACT/GRANT NUMBER**- DOEAC06-87RL10930

**REPORT NUMBER(S)**- WHC-SD-WM-DP--109-Rev.1

**SUBFILE CODE**- ELC

**PUBLICATION COUNTRY**- US

**ANNOUNCEMENT CODE**- EDB; ERA; ETD; INS; NTS

**Document Order Number**- DE97050985

**SPONSORING ORGANIZATION CODE(S)**- DOE/EM

**CORPORATE ENTRY CODE**- 9500104

**INCOMING TAPE SERIAL NUMBER**- 95000205

**ANNOUNCEMENT IDENTIFICATION**- WHC-96:95000205; EDB-97:006110

**LANGUAGE**- English

This is the final report for tank 241-U-203, cores 79 and 80. These samples were analyzed for safety screening purposes in accordance with the Tank 241-U-203 Tank Characterization Plan (TCP; Reference 1), and these primary safety screening results were provided in the 45-day report for tank 241-U-203 (Reference 2). The results of the lithium analysis by inductively coupled plasma atomic emission spectroscopy ( ICP ) analysis, performed to determine the extent of any possible hydrostatic head fluid (HHF) contamination due to sampling, were also provided in Reference 2. This final report contains the analysis results requested by the organic data quality objective (DQO), namely the total organic carbon ( TOC ) results.

**DESCRIPTOR(S)** - \*HANFORD RESERVATION --Radioactive waste storage; \*RADIOACTIVE

WASTES --Chemical analysis DRILL CORES; EMISSION SPECTROSCOPY; ORGANIC COMPOUNDS; TANKS IDENTIFIER(S)- CONTAINERS; MANAGEMENT; MATERIALS; NATIONAL ORGANIZATIONS; RADIOACTIVE MATERIALS; RADIOACTIVE WASTE MANAGEMENT; SPECTROSCOPY; STORAGE; US DOE; US ERDA; US ORGANIZATIONS; WASTE MANAGEMENT; WASTE STORAGE; WASTES  
SECTIONAL CLASSIFICATION CODE- 052002

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**18. Fundamental investigation of deep sea water. Part 1**

EDB 95 16 95:106251 95001424125 NDN- 108-0614-6761-7

Kawakita, H.; Tamura, M.; Sawamura, K., (Kochi Prefectural Industrial Technology Center, Kochi (Japan)); Yamaguchi, M.; Ueno, Y.; Okamura, Y.

**JOURNAL NAME** - Kochi-ken Kogyo Gijutsu Senta Kenkyu Hokoku (Reports of Kochi Prefectural Industrial Technology Center) (Japan)

**NO. 25**

1994-10-01

**PP. 6-10**

**DOCUMENT TYPE**- Journal Article

ISSN- 0916-8729

**CODEN**- KGSHEV

**AUTHOR AFFILIATION**- Kochi Prefectural Industrial Technology Center, Kochi (Japan)

**LOCATION OF WORK**- JP

**SUBFILE CODE**- NEDO

**PUBLICATION COUNTRY**- JP

**ANNOUNCEMENT CODE**- EDB; ETD

**INCOMING TAPE SERIAL NUMBER**- 95:930075

**ANNOUNCEMENT IDENTIFICATION**- NEDO-95:930075; EDB-95:106251

**LANGUAGE**- Japanese

Deep sea water is expected to be utilized not only in fishery, but also in wide fields, such as agriculture and forestry, industry, and medical treatment. In this study, deep sea water and surface sea water have been analyzed through a year. The analytical items consist of common items, major elements, nutrient salts, and trace elements. For the analysis of trace metal elements, in order to concentrate efficiently, treatment of concentration and desalination was conducted by means of column method using chelate ion exchange resin. For the analyses, pH meter, absorptiometer, ion chromatographic analyzer, ICP (inductively coupled plasma) spectrophotometer, atomic absorption photometer, total organic carbon analyzer, super deionizer, and ion counter were used. As a result, it was found that the temperature of deep sea water ranges from 10.8 to 13.5 centigrade, which is stable. The low temperature stability and cleanliness of deep sea water were confirmed. The eutrophy of deep sea water was also confirmed. For the major elements and trace metal elements, distinguished difference was not detected. 10 refs., 1 fig., 4 tabs.

**DESCRIPTOR(S)** - \*CHEMICAL ANALYSIS --Ion exchange materials; \*CHEMICAL ANALYSIS --Metals; \*CHEMICAL ANALYSIS --Nutrition; \*CHEMICAL ANALYSIS --Ph value; \*SEAWATER --Chemical analysis; \*SEAWATER --Depth; \*SEAWATER --Surface waters; \*TEMPERATURE MEASUREMENT --Stability ABSORPTION SPECTROSCOPY; EMISSION SPECTROSCOPY

IDENTIFIER(S)- DIMENSIONS; ELEMENTS; HYDROGEN COMPOUNDS; MATERIALS; OXYGEN COMPOUNDS; SPECTROSCOPY; WATER  
SECTIONAL CLASSIFICATION CODE- 423000

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19. Aqueous sample from B-Plant, Tank 9-1, Revision 1  
EDB 95-15 95:094967 95001404826 NDN- 108-0613-5492-6

Bell, K. E..(M).

1995-05-18

263 page(s)

**DOCUMENT TYPE-** Report

**CORPORATE AUTHOR-** Westinghouse Hanford Co., Richland, WA (United States)

**LOCATION OF WORK-** US

**SPONSORING AGENCY-** USDOE, Washington, DC (United States)

**CONTRACT/GRANT NUMBER-** DOEAC06-87RL10930

**REPORT NUMBER(S)-** WHC-SD-WM-DP--081-Rev.1; WHC-SD-WM-DP--081-Rev.1

**SUBFILE CODE-** TIC

**PUBLICATION COUNTRY-** US

**ANNOUNCEMENT CODE-** EDB; ERA; ETD; INS; NTS

**Document Order Number-** DE95013333

**SPONSORING ORGANIZATION CODE(S)-** DOE

**CORPORATE ENTRY CODE-** 9500104

**ANNOUNCEMENT IDENTIFICATION-** INS-95:014286; NTS-95:018385; EDB-95:094967

**LANGUAGE-** English

Eight liquid samples were received from B-Plant Tank 9-1 in four lots of two samples each, for inorganic and organic analysis. This is the final report for the sampling and analysis effort; included are summary tables of the analytical and quality control data as well as all raw data. The analyses include pH, OH, inductively coupled plasma spectrography, ion chromatograph, total organic carbon, total inorganic carbon, and differential scanning calorimetry. Included are copies of the chain of custody and request for special analysis forms.

**DESCRIPTOR(S) -** \*HANFORD RESERVATION --Radioactive waste facilities; \*RADIOACTIVE WASTES --Chemical analysis LIQUID WASTES; QUALITY CONTROL; SAMPLING  
**IDENTIFIER(S)-** CONTROL; MATERIALS; NATIONAL ORGANIZATIONS; NUCLEAR FACILITIES; RADIOACTIVE MATERIALS; US DOE; US ERDA; US ORGANIZATIONS; WASTES

**SECTIONAL CLASSIFICATION CODE-** 052000

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Citations from Energy Science and Technology (DOE): ED1

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20. Analysis of Rio Blanco 1 sour waters

EDB 83-09 83:073649 8304017829 NDN- 168-0358-6883-5

Olsen, K. B.; Sanders, R. W.(A); Nielsen, J. M.(M)

1983-02

12 page(s)

**DOCUMENT TYPE-** Report Analytic

**MONOGRAPH TITLE-** Pacific Northwest Laboratory annual report for 1982 to the DOE Office of Energy Research. Part 4. Physical sciences

**LOCATION OF WORK-** US

**REPORT NUMBER(S)-** PNL--4600-Pt.4

**PUBLICATION COUNTRY-** US

**ANNOUNCEMENT CODE-** EDB; ERA

**Document Order Number-** DE83007471

**ANNOUNCEMENT IDENTIFICATION-** ERA-08:025611; EDB-83:073649

Samples were collected from the transfer line to a water storage tank from the storage tank and of condensate water. The samples were analyzed for trace elements by DC plasma emission spectroscopy as well as for pH, alkalinity, ammonia, total oxygen content (TOC), chemical oxygen demand (COD), and conductivity. Comparison of the samples demonstrated a number of trends in alkalinity, ammonia, and conductivity TOC and COD. In all cases, the trace element concentrations were very low with the exception of potassium, magnesium calcium, sodium, and silicon. The relative abundance of these latter elements indicates the presence of groundwater, as expected in an in-situ retort. Data are tabulated. (PSB)

**IDENTIFIER(S)-** BITUMINOUS MATERIALS; CARBONACEOUS MATERIALS; CHEMICAL REACTIONS; DECOMPOSITION; ENERGY SOURCES; FOSSIL FUELS; FUELS; HYDROGEN COMPOUNDS; IN-SITU PROCESSING; LIQUID WASTES; MANAGEMENT; MATERIALS; OXYGEN COMPOUNDS; POLLUTION; PROCESSING; RETORTING; WASTES; WATER

**SECTIONAL CLASSIFICATION CODE-** 041000

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Citations from ENGINEERING INDEX: EIX

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**21. Submicron particles in the Rhine River - I. Physico-chemical characterization**

EIX 94-06 EIX94061151029 NDN- 017-0197-3901-5

Perret, Didier; Newman, Meredith E.; Negre, Jean-Claude; Chen, Yuwei; Buffle, Jacques

Water Research v 28 n 1 Jan 1994. p 91-106

1994

**DOCUMENT TYPE-** JA, Journal Article

**ISSN-** 0043-1354

**CODEN-** WATRAG

**AUTHOR AFFILIATION-** Univ of Geneva, Geneva, Switz

**JOURNAL NAME-** Water Research

**LANGUAGE-** English

This paper describes a complete sampling, fractionation and characterization scheme for submicrometer particles isolated from the Rhine River. Decreasing particle size fractions were obtained by means of gravitational sedimentation, cascade centrifugation/ultracentrifugation and cascade filtration. These size fractions were analyzed by photon correlation spectroscopy (PCS), micro-electrophoresis (ME), transmission electron microscopy (TEM), light scattering (LS), inductively coupled plasma-atomic emission spectrometry (ICP-AES) and total organic carbon (TOC), which gave complementary results concerning the nature of the particles. The data indicated that submicron particles contribute only a small proportion of the total particle mass and volume, but an important proportion of the total particle number. Moreover, their specific surface area may be quite large. Associations of submicrometer particles with organic macromolecules and fibrils, which may have maintained such particles in suspension, were observed. (Author abstract) Refs.

**DESCRIPTOR(S)** - Agglomeration; Centrifugation; Coagulation; Colloids; Filtration; Fractionation; Particles (particulate matter); Rivers; Sedimentation

**IDENTIFIER(S)** - Inductively coupled plasma atomic emission spectrometry (ICP-AES); Microelectrophoresis (ME); Photon correlation spectroscopy (PCS); Rhine River, Switzerland; Submicron particles; Total organic carbon (TOC)

**TREATMENT CODE**- TC-X (Experimental)

**SECTIONAL CLASSIFICATION CODE**- CAL453.1; CAL931.2; CAL801.3; CAL802.3; CAL444.1; CAL801.4.1

**SECTION HEADING**- Water pollution

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## 22. Measurements of distribution properties of commercial extractants with ICP and TOC methods.

EIX 93-05 EIX93050058817 NDN- 017-0184-6247-2

Shibata, Junji; Emoto, Kazuhiro

Metall Rev MMJ v 9 n 1 Jul 1992 p 85-92  
1992

**DOCUMENT TYPE**- JA, Journal Article

**ISSN**- 0289-6214

**CODEN**- MRMMED

**AUTHOR AFFILIATION**- Kansai Univ, Osaka, Japan

**MONTHLY PUBLICATION NO.**- 059807

**JOURNAL NAME**- Metallurgical Review of MMJ (Mining and Metallurgical Institute of Japan)

**LANGUAGE**- English

The distribution behaviors of phosphorus-containing extractants such as D2EHPA between water and a diluent were investigated by measuring the phosphorus concentration with an inductively coupled plasma atomic emission spectrophotometer. The distribution of Versatic Acid 10, which did not contain phosphorus, was also studied by measuring the carbon concentration with a total organic carbon analyzer. Distribution experiments were carried out at various pH values and ionic strengths in the presence of kerosene or benzene as a diluent. From the experimental data, equilibrium constants relating to the distribution phenomena were calculated according to the non-linear least square method; the dissociation constant, dimerization constant and partition coefficient were determined for D2EHPA and Versatic acid 10. (Author abstract) 5 Refs.

**descriptor(s)**- DISSOCIATION; MEASUREMENTS; PHOSPHORUS COMPOUNDS; PLASMA APPLICATIONS; SPECTROPHOTOMETERS

**Identifier(s)** - ATOMIC EMISSION SPECTROPHOTOMETER; DIMERIZATION; INDUCTIVELY COUPLED PLASMAS; PARTITION; TOTAL ORGANIC CARBON

**Treatment Code**- TC-X (Experimental)

**Sectional Classification Code**- CAL533; CAL932; CAL941; CAL804; CAL802

**Section Heading**- EXTRACTIVE METALLURGY

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Citations from Engineering Index (1983-1989): EI1

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**23. Studies of distribution of commercial extractants between diluent and water.**

EIX 89-04 EIX89040031117 NDN- 163-0240-5307-5

Emoto, Kazuhiro; Shibata, Junji; Sano, Makoto; Nishimura, Sanji

Technol Rep Kansai Univ n 30 Mar 1988 p 71-80  
1988

**DOCUMENT TYPE**- JA, Journal Article

ISSN- 0453-2198

CODEN- TRKUAW

**AUTHOR AFFILIATION**- Kansai Univ, Suita, Jpn

**PATENT REFERENCE(S)**- Technology Reports of Kansai University

**PATENT STATUS INFO**- 031323

**LANGUAGE**- English

The distribution behaviors of phosphorus-containing extractants such as D2EHPA, TBP and TOPO between water and a diluent were investigated by measuring the phosphorus concentration with an inductively coupled plasma atomic emission spectrophotometer. The distribution of Versatic Acid 10, which did not contain phosphorus, was also studied by measuring the carbon concentration with a total organic carbon analyzer. Distribution experiments were carried out at various pH values and ionic strengths in the presence of kerosene or benzene as a diluent. (Edited author abstract) 6 Refs.

**descriptor(s)** - CHEMICAL OPERATIONS --Solvent Extraction; EXTRACTION --Trace Analysis

**Identifier(s)**- DILUENTS; EXTRACTANTS; MODIFIERS

**Treatment Code**- TC-X (Experimental)

**Sectional Classification Code**- CAL801; CAL802

**Section Heading**- CHEMICAL ANALYSIS --Extraction

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Citations from Geological Abstracts (GEOREF): GEO

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**24. Composition and transformation of argillaceous cutans in soils as dependent on the character of gleyzation processes and parent rocks**

GEO 99-23 1999-068155 NDN- 004-0344-3686-4

Zaidel'man, F. R.; Nikiforova, A. S.

**JOURNAL NAME-** Eurasian Soil Science**VOL.** 32**NO.** 6

1999-06

**PP.** 624-632**FIGURES-** 5 tables**DOCUMENT TYPE-** Serial**BIBLIOGRAPHIC LEVEL-** Analytic**ISSN-** 1064-2293**CODEN-** SSSCAE**AUTHOR AFFILIATION** - Moscow State University, Faculty of Soil Science, Moscow, Russian Federation**PUBLISHER-** MAIK Nauka/Interperiodica Publishing, Birmingham, AL, United States**PUBLICATION COUNTRY-** United States**UPDATE DATE-** 1999-23**LANGUAGE-** English

The paper considers the chemical composition of argillaceous cutans (argillans) in a range of soil types on various parent rocks (glacial, postglacial, and pre-Quaternary). The morphological and chemical composition of the cutans is revealed to be in close correlation with the degree of hydromorphism. Illuvial horizons of soddy-podzolic and boggy-podzolic soils are shown to develop under the influence of chemically aggressive mobile fractions of humic substances. Pedogenetic processes are especially pronounced along soil fractures. Cutans carry information on the development of podzolic process and degree of gleyzation in the soil profile. The criteria of gleyzation are (1) the loss of total iron from the fine material of the cutans, (2) the loss of non-silicate iron from the diffusive material ( plasma ) of the cutans, and (3) the increase in SiO<sub>2</sub> : Fe<sub>2</sub>O<sub>3</sub> ratio in the cutans.

**DESCRIPTOR(S)** - argillaceous cutans; carbon; chemical composition; clay minerals; cutans; factors; glacial environment; gleyzation; iron; metals; micromorphology; mineral composition; organic carbon; organic compounds; parent materials; pedogenesis; postglacial environment; processes; saturation; sheet silicates; silicates; soil profiles; soil surveys; soils; surveys; total organic carbon; transformations; water content; Boggy podzolic soils; Commonwealth of Independent States; Europe; Gleys; Kolomenskiy Russian Federation; Kotelnicheskiy Russian Federation; Moscow Russian Federation; Novgorod Russian Federation; Russian Federation; Ruzskiy Russian Federation; Sod-podzolic soils; Vyatka Russian Federation**SECTION HEADING CODE-** 25**SECTION HEADING-** Soils

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**25. Mineralogical and geochemical traits of the Egret Member oil source rock (Kimmeridgian), Jeanne d'Arc Basin, offshore Newfoundland, Canada**

GEO 96-19 96-60837 NDN- 004-0317-7421-7

Bateman, Jason A.

200 page(s)

142 reference(s)

**FIGURES**- illus., 9 tables

**DOCUMENT TYPE**- Master's

**LOCATION OF WORK**- Dalhousie University

Halifax, NS

CAN

**LANGUAGE**- English

The Jeanne d'Arc Basin is a Mesozoic failed-rift basin situated within the Grand Banks, 100 km off the east coast of Newfoundland, Canada. Several large oil and gas fields have been discovered in the area, the giant Hibernia field being the most notable. The Kimmeridgian-aged Egret Member is the primary generator of hydrocarbons within the basin and has a log response indicative of significant internal variability. Due to the absence of cores or outcrop (Egret Member), the specific nature of this litho-chemical heterogeneity is largely unknown, therefore, it has been difficult to resolve the intervals deposition, accumulation and preservation history. As part of a broader, hydrocarbon habitat study, a comprehensive organic, inorganic, chemical and physical characterization of the interval has been prepared. Of the 22 wells that penetrate the Egret Member within the basin, 5 wells have been examined in detail, namely: Rankin M-36, Port au Port J-97, Voyager J-18, Fortune G-57, and Trave E-87. X-ray diffraction (XRD), Environmental Scanning Electron Microscope (ESEM), and whole-rock (Inductively Coupled Plasma) chemical analyses have been performed on Egret Member well cutting samples. In addition, a detailed lithological and Rock-Eval/TOC characterization has been conducted on handpicked cutting samples from Trave E-7 87 and Fortune G-57. Whole-rock XRD and ESEM analyses indicate that the Egret Member is composed primarily of quartz, calcite, feldspar, dolomite, and pyrite. Illite, mixed-layer illite/smectite (with typically <10% smectite), and subordinate amounts of kaolinite, chlorite, and mixed-layer chlorite/vermiculite are the dominant clay minerals contained in the <2  $\mu$ m fraction. No free-swelling smectites have been identified within the interval. Quartz, calcite, and feldspar are interpreted as depositional in origin, with dolomite and pyrite being controlled by diagenetic processes. The clay mineral assemblage is also interpreted as detrital in origin, however sufficient levels of thermal maturation have been reached to account for some diagenetic modifications. Comparisons of the clay mineral assemblages and maximum burial temperatures of the interval suggest that the Egret Member is diagenetically moderate-mature in Port au Port J-97 and Rankin M-36, and mature in Voyager J-18, Trave E-87, and Fortune G-57. Carbon-iron-sulphur relationships in Egret Member shales suggest that the Egret has experienced reducing conditions episodically in the past, and these conditions have facilitated the diagenetic modification of the source interval through anaerobic sulphate reduction. Carbon-iron relationships for the interval suggest that iron was not a limiting factor during pyrite formation, and that iron was readily available for incorporation into alternative authigenic ferroan species upon burial. Carbon-sulphur relationships suggest that during the deposition of Egret sediments, variable bottom-water oxygen levels persisted throughout the Jeanne D'Arc Basin. Four lithological components have been identified within the Egret Member source interval. In order of abundance, they are: 1) a dark-brown laminated shale; 2) a grey to grey-brown shale; 3) a light brown marlstone/limestone; and 4) a fine-grained sandstone and siltstone. Rock-Eval/TOC properties of each lithology suggest that each rock-type contributes different levels of organic richness to the interval's overall character and may serve to control expulsion efficiencies within the source system. The dark-brown shale has the highest potential for hydrocarbon generation amongst the identified lithologies, owing to its organic richness (between 3-10 wt% TOC), oil-prone kerogen type (predominantly type II), and thermal maturity (T<sub>max</sub> values ranging from 426-439 degrees C). The grey to grey-brown shales, also have a minor potential for hydrocarbon

generation. A silled basin, stratified water column model is favoured to explain observed lithological and organic geochemical variabilities in the Egret Member. Deposition was regulated by fluctuating bottom water oxygen levels in response to orbitally-controlled sea level and climatic changes during the Kimmeridgian time period. In this model, bottom water anoxia correlates with periods of high sea level, warm climatic conditions, and sluggish oceanic convection, resulting in the deposition and enhanced preservation of organic-rich shale containing marine-derived organic matter. During periods of low sea level, deposition is characterized by rapid sedimentation, cooler climatic conditions, and increased oceanic convection, resulting in the accumulation of organic-lean shale and carbonate associated with terrestrial-derived organic matter.

**DESCRIPTOR(S)**- Atlantic Ocean; Canada; clay minerals; depositional environment; Eastern Canada; geochemistry; inductively coupled plasma methods; Jeanne d'Arc Basin; Jurassic; Kimmeridgian; lithogeochemistry; Mesozoic; mineral assemblages; Newfoundland, North Atlantic; offshore; organic materials; petroleum; Rock-Eval; sheet silicates; silicates; source rocks; spectroscopy; thermal maturity; Upper Jurassic; X-ray diffraction data

**IDENTIFIER(S)**- Egret Member

**SECTION HEADING CODE**- 29; 02

**SECTION HEADING**- ECONOMIC GEOLOGY-ENERGY SOURCES; GEOCHEMISTRY

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Citations from INSPEC: INS

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**26. The characterization of 0.1  $\mu$  m LPD (light point defect) patterns in mass production of silicon wafer**

INS 99-39 6369719 A1999-21-8160C-031 (PHA) NDN- 174-0636-9718-7

Han-Seog Oh; Hyun-Jae Maeng; Ki-Man Bae; Jong-Rok Kim; Young-Ki Hong; Ji-Shik Shin; Jae-Hoon Kwon; Rozgonyi, G. A.; Hong-Lim Lee

**EDITOR**- Huff, H. R.; Tsuya, H.; Gosele, U.

**ABBREVIATED JOURNAL TITLE**- Proceedings of the Eighth International Symposium on Silicon Materials Science and Technology. Silicon Materials Science and Technology

**PART NUMBER**- vol. 1

1998

**PP.** 707-23 vol. 1

2 vol. xx+1638 page(s)

36 reference(s)

**DOCUMENT TYPE**- Conference paper

**ISBN**- 1 56677 193 5

**CORPORATE AUTHOR**- Yonsei Univ., Seoul, South Korea

**SPONSORING AGENCY**- Electrochem. Soc

**COPYRIGHT OF BIBLIOGRAPHIC**- Copyright 1999, IEE

**PUBLISHER**- Electrochem. Soc

**PUBLICATION PLACE**- Pennington, NJ, USA

**PUBLICATION COUNTRY**- USA

**CONFERENCE DATE**- 4-8 May 1998

**CONFERENCE TITLE**- Proceedings of 8th International Symposium on Semiconductor Silicon

**CONFERENCE LOCATION-** San Diego, CA, USA  
**LANGUAGE-** English (DEF)

We have gathered and reviewed various 0.1  $\mu$ m LPD phenomena from mass production line. The LPD means light point defect by laser scattering instrument. For larger than 0.2  $\mu$ m LPD phenomena, we called it "particle", and, therefore the laser scattering instrument was a "particle counter". However, 0.1  $\mu$ m level LPD shows a totally different tendency. We have found some unique distribution patterns of LPD. Although these patterned wafers are very few in mass production lines due to the development of wafering processes, the characterization of these wafers shows the direction of future development on 0.1  $\mu$ m LPD phenomena. For the characterization, we used inductively coupled plasma mass spectroscopy, atomic absorption spectroscopy, total reflection X-ray fluorescence, ion chromatography, total organic carbon, minority carrier recombination lifetime, transmission X-ray topography and defect etching, and surface evaluation was done with laser scattering instrument, atomic force microscopy and Nomarski microscopy. From the characterizations, we classified three kinds of similar pattern. (1) Crystal originated particle dependant LPD, (2) LPD pattern due to metal and ion combined contamination and (3) LPD pattern due to interaction of organic contaminant and crystal defect.

**DESCRIPTOR(S)** - atomic absorption spectroscopy; atomic force microscopy; chromatography; elemental semiconductors; etching; light scattering; mass spectroscopic chemical analysis; optical microscopy; point defects; silicon; surface cleaning; surface contamination; surface topography; X-ray fluorescence analysis

**IDENTIFIER(S)** - atomic absorption spectroscopy; atomic force microscopy; combined metal and ion contamination; crystal defect; crystal originated particle; defect etching; ion chromatography; laser scattering; light point defect patterns; mass production; microroughness; minority carrier recombination lifetime; organic contaminant; particle counter; patterned wafers; silicon wafer; surface evaluation; total organic carbon; total reflection X-ray fluorescence; transmission X-ray topography; ICP mass spectroscopy; Nomarski microscopy; Si; 0.1 micron

**NUMERICAL DATA INDEXING**- size 1.0E-07 m

**CHEMICAL INDEXING**- Si/sur Si/el

**TREATMENT CODE**- TC-X

**SECTIONAL CLASSIFICATION CODE**- A8160C; A6820; A6170B; B2550E; B2520C

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Citations from Life Sciences Collection (LSC): LSC

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**27. Water-soluble prodrug of vitamin E for parenteral use and its effect on endotoxin-induced liver toxicity**

LSC 97-07 4062909 NDN- 122-0173-2382-3

Takata, J.; Ito, S.; Karube, Y.\*; Nagata, Y.; Matsushima, Y.

**ABBREVIATED JOURNAL TITLE**- BIOL. PHARM. BULL.

vol. 20, no. 2, pp. 204-209

1997

**DOCUMENT TYPE**- Journal Article

**BIBLIOGRAPHIC LEVEL**- Analytical, Serial

**ISSN**- 0918-6158

**AUTHOR AFFILIATION**- Fac. Pharma. Sci., Fukuoka Univ., 8-19-1 Nanakuma, Johnan-ku, Fukuoka 814-80, Japan  
**LANGUAGE**- English

The acid salts of aminoalkanecarboxylic acid esters of d- alpha -tocopherol were in a previous in vitro study identified as prodrug candidates for a parenteral form of d- alpha -tocopherol. The disposition of d- alpha -tocopheryl N,N-dimethylaminoacetate hydrochloride (TDMA), the most potential candidate for the prodrug, after a single intravenous administration was investigated and compared with that of the d- alpha -tocopheryl acetate (TA) and dl- alpha -tocopherol, solubilized with HCO-60, in order to establish the utility as a prodrug for i.v. administration. The preventive effect of the prodrug against endotoxin (lipopolysaccharide (LPS))-induced liver lipid peroxidation was also investigated in mice. The **plasma** and liver levels of alpha -tocopherol ( **Toc** ) were increased rapidly after i.v. administration of the prodrug. The distribution of **Toc** and TDMA in the **plasma** and the liver at 1 h was as follows; 2.1 plus or minus 0.2 ( **plasma** , **Toc** ), 2.0 plus or minus 0.2 ( **plasma** , TDMA), 32.8 plus or minus 2.9 (liver, **Toc** ), and 35.3 plus or minus 6.5% of dose (liver, TDMA). The rapid and liver-selective uptake and liver-esterase specific regeneration characteristics of the prodrug enhance the delivery of **Toc** to liver. The liver availability of **Toc** after i.v. administration of TDMA, TA and **Toc** were 116, 50 and 100%, respectively. The elevation of liver lipid peroxide induced with LPS was significantly suppressed to a normal range by a single i.v. postadministration of TDMA (over 10 mg/kg equivalent for **Toc** ). These results indicated that the water-soluble and liver-esterase hydrolyzable derivative of **Toc** was a potential candidate for a parenteral prodrug which can thus achieve the systemic liver-specific delivery of **Toc** . Such effective and selective delivery of **Toc** into the liver can therefore lead to enhanced pharmacological efficacy against liver oxidative injury associated with free radicals.

**DESCRIPTOR(S)** alpha -tocopherol; endotoxins; lipid peroxidation; lipopolysaccharides; liver  
**SECTIONAL CLASSIFICATION CODE**- 24171, Microbial

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**28. Acetaminophen-induced hepatic injury in mice: The role of lipid peroxidation and effects of pretreatment with coenzyme Q sub(10) and alpha -tocopherol**  
 LSC 95-09 3764087 NDN- 122-0149-5759-0

Amimoto, T.; Matsura, T.\*; Koyama, S.-Y.; Nakanishi, T.; Yamada, K.; Kajiyama, G.

**ABBREVIATED JOURNAL TITLE**- FREE RADICAL BIOL. MED.  
 vol. 19, no. 2, pp. 169-176  
 1995

**DOCUMENT TYPE**- Journal Article

**BIBLIOGRAPHIC LEVEL**- Analytical, Serial

**ISSN**- 0891-5849

**AUTHOR AFFILIATION** - Dep. Bacteriol., Hiroshima Univ. Sch. Med., 1-2-3 Kasumi, Minami-ku, Hiroshima 734, Japan

**LANGUAGE**- English

This study was performed to determine whether oxidative stress contributed to the initiation or progression of hepatic injury produced by acetaminophen (APAP). Treatment of fasted mice with APAP (400 mg/kg, IP) led to hepatic injury as indicated by a marked elevation of **plasma** alanine aminotransferase (ALT). APAP caused an increased amount of thiobarbituric acid-reactive substance

(TBARS), which was accompanied by a loss of reduced forms of coenzyme Q sub(9) (CoQ sub(9)H sub(2)) and coenzyme Q sub(10)(CoQ sub(10)H sub(2)) functioning as antioxidants. APAP also markedly decreased hepatic reduced glutathione (GSH) levels. Pretreatment with CoQ sub(10) (5 mg/kg, IV) reduced hepatic TBARS levels to 30% and plasma ALT levels to 26% of placebo pretreatment levels without affecting hepatic GSH levels at 3 h of APAP treatment. alpha -Tocopherol ( alpha -Toc) (20 mg/kg, IV) pretreatment also reduced hepatic TBARS levels to 13% and plasma ALT levels to 27% of placebo pretreatment levels without affecting hepatic GSH levels. These results suggest that oxidative stress followed by lipid peroxidation might play a role in the pathogenesis of APAP-induced hepatic injury, and pretreatment with lipid-soluble antioxidants such as CoQ sub(10) and alpha -Toc can limit hepatic injury produced by APAP.

**DESCRIPTOR(S)**- acetominophen; lipid peroxidation; liver; mice; oxidation; ubiquinones; vitamin E  
**SECTIONAL CLASSIFICATION CODE**- 24111, Biochemistry

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Citations from POLLUTION ABSTRACTS: PAB

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**29. Trace Metal Levels in Chironomid Larvae and Sediments from a Bolivian River: Impact of Mining Activities**

PAB 30-08 4461477 NDN- 090-0025-2897-6

Bervoets, L.; Solis, D.; Romero, A. M.; Damme, P. A.; Ollevier, F.

**JOURNAL NAME**- Ecotoxicology and Environmental Safety *Ecotoxicol. Environ. Saf.*  
vol. 41, no. 3, pp. 275-283  
19981100

**DOCUMENT TYPE**- Journal Article

**BIBLIOGRAPHIC LEVEL**- Analytical, Serial

**ISSN**- 0147-6513

**AUTHOR AFFILIATION**- Department of Biology, University of Antwerp (RUCA), Groenenborgerlaan 171, Antwerp, 2020, Belgium

**PUBLISHER**- Academic Press

**LANGUAGE**- English

The effect of mining activity on metal accumulation in sediments and Chironomidae in a river in Bolivia was assessed. Surficial sediments and midge larvae (Chironomidae, Diptera) were collected at five sampling sites. Concentrations of the trace metals Cd, Cu, Cr, Ni, Pb, and Zn were measured in organisms and sediments by inductively coupled plasma atomic emission spectrometry. Sediments were subjected to two different extraction procedures to identify total trace metals and reducible trace metals. Geochemical characteristics of the sediment were analyzed: total organic carbon ( TOC ), Fe and Mn oxides, and particle size distribution. To determine the relative importance of the different sediment factors contributing to the variation in metal accumulation by the chironomid larvae, nonlinear regression models were constructed. No increase in metal concentration in sediment could be measured downstream of the mining activity. Larval concentrations, however, increased markedly. Only for zinc and chromium was a significant amount of variation (48 and 73%, respectively) found. The lack of relationship for the other metals probably was due to a unmeasured exposure route, the overlying water.

**descriptor(s)** - Aquatic insects; Bioaccumulation; Bolivia; Bolivia; Cadmium; Chironomidae; Chironomidae; Chromium; Copper; Fluvial Sediments; Freshwater environments; Freshwater pollution; Geochemistry; Heavy metals; Insect larvae; Larvae; Midges; Mine tailings; Mineral Industry; Mining; Nickel; Oxides; Particulate Matter; Pollution; Pollution effects; Regression Analysis; Rivers; Sediment pollution; Sedimentation; Sediments; Trace metals

**Identifier(s)** - Diptera; Midges; Pb; Zn

**Sectional Classification Code** - 2000, FRESHWATER POLLUTION

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Citations from Selected Water Resources Abstracts: WR1

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**30. Nation-Wide Survey of the Chemical Composition of Drinking Water In Norway.**

WRA 25-02 W92-01841 NDN- 054-0014-1181-7

Flaten, T. P.

Science of the Total Environment STENDL, Vol. 102, p 35-73, February 1991. 9 fig, 8 tab, 66 ref.

**Corporate Author** - Geological Survey of Norway, Trondheim. Dept. of Geochemistry.

**Source Code** - 079990001

Water samples were collected from 384 waterworks that supply 70.9% of the Norwegian population. The samples were collected after water treatment and were analyzed for 30 constituents. Although most constituents showed wide concentration ranges, Norwegian drinking water was generally soft. The median values obtained were: 0.88 mg Si/L, 0.06 mg Al/L, 47 microgram Fe/L, 0.69 mg Mg/L, 2.9 mg Ca/L, 3.8 mg Na/L, 6 microgram Mn/L, 12 microgram Cu/L, 14 microgram Zn/L, 9 microgram Ba/L, 15 microgram Sr/L, 0.14 mg K/L, 58 microgram F(-)/L, 6.4 mg Cl(-)/L, 11 microgram Br(-)/L, 0.46 mg NO3(-)/L, 5.3 mg SO4(2-)/L, 2.4 mg total organic carbon/L, 6.8 pH, 50 micrcosiemens/cm (conductivity), and 11 mg pt/L (color). Titanium, Pb, Ni, Co, V, Mo, Cd, Be and Li were seldom or never quantified, due to insufficient sensitivity of the inductively coupled plasma method. Norwegian quality criteria, which exist for 17 of the constituents examined, were generally fulfilled, indicating that the chemical quality of drinking water, by and large, was good in Norway. For Fe, Ca, Mn, Cu, pH, total organic carbon and color, however, the norms for good drinking water were exceeded in more than 9% of the samples, reflecting two of the major problems associated with Norwegian drinking water supplies: many water sources contain high concentrations of humic substances and in large parts of the country, the waters are soft and acidic, and therefore corrosive towards pipes, plumbing and other installations. Most constituents showed marked regional distribution patterns that can be explained by chemical weathering of mineral matter, atmospheric supply of salt particles from the sea, anthropogenic pollution (including acid precipitation), corrosion of water pipes and plumbing, water treatment, decomposition of organic matter, and hydrological differences. (Author's abstract)

**descriptor(s)** - Chemical composition; Drinking water; Norway; Water chemistry; Water quality; Water quality trends

**Secondary Descriptor(s)** - Acidic water; Aluminum; Barium; Bromine; Calcium; Chlorine; Conductivity; Copper; Fluorides; Hydrogen ion concentration; Iron; Magnesium; Manganese; Metals; Nitrates; Organic carbon; Particulates; Silicon; Sodium; Strontium; Sulfates; Water quality standards; Water softening; Zinc

**Section Heading Code** - 05F; 07B

**SECTION HEADING - WATER QUALITY MANAGEMENT AND PROTECTION --WATER TREATMENT AND QUALITY ALTERATION; RESOURCES DATA --DATA ACQUISITION****31. Toxicology of Natural and Man-Made Toxicants in Drinking Water.**

WRA 20-09 W87-07309 NDN- 054-0008-6767-2

Bull, R. J.

Available from the National Technical Information Service, Springfield, Virginia 22161, as PB84-246255. Price codes: A02-PC in papercopy, A61-MT in microfiche. EPA Report No. EPA-600/D-84-222, September 1984. 14 p, 5 tab, 11 ref.

**CORPORATE AUTHOR**- Health Effects Research Lab., Cincinnati, OH.**SOURCE CODE**- 057052000

Drinking water obtained from surface sources contains a very large variety of organic chemicals. The **total organic carbon** present in the source water is made up of both natural and man-made chemicals. In most instances natural organic material predominates and is largely made up of humic and fulvic acids. The introduction of chlorine into drinking water results in the formation of a variety of by-products including the trihalomethanes, haloacetonitriles, halogenated aldehyde and halogenated ketone derivatives. Representatives of these classes of chemicals have been shown to be mutagenic and/or carcinogenic. More recent studies have shown that similar chemicals are formed upon direct administration of chlorine solutions to rats. Hypochlorite and monochloramine (a common alternative disinfectant to chlorine) have been shown to be capable of increasing the percent of structural abnormalities in mice at low doses (4 mg/kg/day for five days). Chlorine dioxide, a proposed alternative disinfectant, has been shown to produce decreases in plasma thyroxine levels at exposures of 100 mg ClO<sub>2</sub>/L of drinking water. It is unlikely that these effects can be attributed to direct effects of disinfectants since they are all extremely reactive molecules and would react freely with the great excess of organic material present in the gastrointestinal tract. It is more likely that these effects can be attributed to reaction products such as those which have been identified in drinking water and/or the stomach contents of experimental animals. Therefore, these data suggest that chemical interactions between a group of chemicals that have been generally regarded as safe (the disinfectants) and other chemicals of a low level of intrinsic toxicity (humic acids, stomach contents) produce potentially hazardous products. (Author's abstract)

**DESCRIPTOR(S)**- Toxicity; Drinking water; Water pollution effects; Water treatment**SECONDARY DESCRIPTOR(S)** - Organic carbon ; Organic compounds; Trihalomethanes; Halocetonitriles; Carcinogens; Chemical analysis**SECTION HEADING CODE**- 05C; 05F**SECTION HEADING**- WATER QUALITY MANAGEMENT AND PROTECTION --EFFECTS OF POLLUTION; WATER QUALITY MANAGEMENT AND PROTECTION --WATER TREATMENT AND QUALITY ALTERATION

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1 NDN 127-0320-1213-0: Evaluating cation conductivity temperature compensation

CAS SECTION- 161

CAS SUBSECTION- 000

2 NDN 127-0294-9532-0: Cation conductivity temperature compensation

CAS SECTION- 161

CAS SUBSECTION- 001

*Citations from CAS - COMBINED DIVISIONS: CA1*

3 NDN 171-0143-1186-0: Pharmaceuticals. Calibration and performance of a conductivity system to meet USP 23

CAS SECTION- 164

CAS SUBSECTION- 001

4 NDN 171-0089-9053-0: Unique temperature compensation for conductivity and resistivity measurements

CAS SECTION- 161

CAS SUBSECTION- 005

*Citations from Energy Science and Technology (DOE): EDB*

5. NDN 108-0643-8363-9: In-situ remediation of hydrocarbon contaminated groundwater in low hydraulic conductivity media using trench and gate technology

6. NDN 108-0619-7563-5: The conductivity of low concentration of CO sub 2 dissolved in water from 0-60 degree C

7. NDN 108-0582-2694-5: Effect of oxide thickness on the properties of metal-insulator-organic semiconductor photovoltaic cells

*Citations from ENGINEERING INDEX: EIX*

8. NDN 017-0274-6840-2: Effect of temperature, temperature error, and impurities on compensated conductivity measurements

*Citations from Engineering Index (1983-1989): EII*

9. NDN 163-0155-1782-0: EVALUATION AND PREVENTION OF ELECTROSTATIC HAZARDS ASSOCIATED WITH OIL TANKER OPERATIONS. PART 3: HAZARDS ASSOCIATED WITH THE SHIPBOARD USE OF GLASS FIBER REINFORCED PLASTIC (GRP) PIPES.

10. NDN 163-0147-2729-6: PREPARATION OF PYROGRAPHITE-COATED CARBON PAPER BY PYROLYSIS OF METHANE ON RESISTIVELY HEATED CELLULOSE-BASED CARBON PAPER.

*Citations from U.S. Patent Bibliographic Database: PA4*

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11. NDN 103-0001-7474-7: RESISTANCE MEASURING BRIDGE CIRCUIT INCLUDING OUTPUT GATING MEANS PATENT NUMBER- 03576491

*Citations from USG/NTIS: USG*

12. NDN 059-0084-6744-6: Electrostatic Charging in Reticulated Foam.

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*Citations from CAS - COMBINED DIVISIONS: CAS*

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1. Evaluating cation conductivity temperature compensation

CAS SECTION- 161

CAS SUBSECTION- 000

CAS 131-04 131-048857 131-048857 NDN- 127-0320-1213-0

Gray, David M.; Bevilacqua, Anthony C.

**ABBREVIATED JOURNAL TITLE-** Ultrapure Water

**VOL.** 16

**NO.** 4

1999

**PP.** 60-64

**DOCUMENT TYPE-** Journal; Primary Pub. Type - Review

**ISSN-** 0747-8291

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**CORPORATE AUTHOR-** Thornton Associates Inc., US, USA

**SUBFILE CODE-** APP

**PUBLISHER-** Tall Oaks Publishing

**SECTION CROSS-REFERENCE-** 0000200003176179

**LANGUAGE-** Eng

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**NO-ABSTRACT**

**IDENTIFIER(S)-** review cation cond temp compensation instrumentation

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**2 Cation conductivity temperature compensation**

**CAS SECTION-** 161

**CAS SUBSECTION-** 001

CAS 130-12 130-157987 130-157987 NDN- 127-0294-9532-0

Gray, David M.; Bevilacqua, Anthony C.

**ABBREVIATED JOURNAL TITLE-** Off. Proc. - Int. Water Conf.

**VOL.** 58th

1997

**PP.** 464-475

**DOCUMENT TYPE-** Journal

**ISSN-** 0739-4977

**CODEN-** OIWCEQ

**CORPORATE AUTHOR-** Thornton Associates, Inc., Waltham, US, USA, MA

**SUBFILE CODE-** APP

**PUBLISHER-** Engineers' Society of Western Pennsylvania

**LANGUAGE-** Eng

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NO-ABSTRACT

**IDENTIFIER(S)**- cation cond temp compensation

**CAS REGISTRY/EC NUMBER(S)**- 7647-01-0 **HEADING PARENT**- Hydrochloric acid

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Citations from CAS - COMBINED DIVISIONS. CAS

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**3. Pharmaceuticals. Calibration and performance of a conductivity system to meet USP 23**

**CAS SECTION**- 164

**CAS SUBSECTION**- 001

CAS 126-03 126-037175 126:037175 NDN- 171-0143-1186-0

Bevilacqua, Anthony C.

**ABBREVIATED JOURNAL TITLE**- Ultrapure Water

**VOL**. 13

**NO.** 8

1996

**PP.** 25, 27-34

**DOCUMENT TYPE**- Journal

**ISSN**- 0747-8291

**CODEN**- ULWAES

**CORPORATE AUTHOR**- Thornton Associates Inc., US, USA

**SUBFILE CODE**- APP

**PUBLISHER**- Tall Oaks Publishing

**LANGUAGE**- Eng

Copyright 2000 by American Chemical Society

NO-ABSTRACT

**IDENTIFIER(S)**- cond water pharmaceutical

**CAS REGISTRY/EC NUMBER(S)**- 7732-18-5 **HEADING PARENT**- Water

---

**4. Unique temperature compensation for conductivity and resistivity measurements**

**CAS SECTION- 161**

**CAS SUBSECTION- 005**

CAS 124-16 124-211303 124-211303 NDN- 171-0089-9053-0

Gray, David M.; Bevilacqua, Anthony C.

**ABBREVIATED JOURNAL TITLE-** Ultrapure Water

**VOL. 13**

**NO. 1**

1996

**PP. 60-2**

**DOCUMENT TYPE-** Journal

ISSN- 0747-8291

CODEN- ULWAE5

**CORPORATE AUTHOR-** Thornton Associates Inc., US, USA

**SUBFILE CODE-** APP

**SECTION CROSS-REFERENCE-** 0000200003163176

**LANGUAGE-** Eng

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NO-ABSTRACT

**IDENTIFIER(S)-** resistivity measurement temp compensation water purifn; temp compensation cond measurement water purifn

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Citations from Energy Science and Technology (DOE): EDB

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**5. In-situ remediation of hydrocarbon contaminated groundwater in low hydraulic conductivity media using trench and gate technology**

EDB 97-10 97:063079 97001776879 NDN- 108-0643-8363-9

Bowles, M., (Calgary Univ., AB (Canada). Dept. of Geology and Geophysics); Rathgeber, J., (Komex International Ltd., Calgary, AB (Canada)); Bentley, L., (Calgary Univ., AB (Canada). Dept. of Geology and Geophysics); Barker, J., (Waterloo Center for Groundwater Research, ON (Canada))

1995

**PP. 35-47**

566 page(s)

**DOCUMENT TYPE-** Book Analytic

**MONOGRAPH TITLE-** Conference Proceedings

**ISBN-** 0-660-59979-1

**AUTHOR AFFILIATION-** Calgary Univ., AB (Canada). Dept. of Geology and Geophysics; Komex International Ltd., Calgary, AB (Canada); Calgary Univ., AB (Canada). Dept. of Geology and Geophysics; Waterloo Center for Groundwater Research, ON (Canada)

**CORPORATE AUTHOR-** Department of the Environment, Ottawa, ON (Canada). Environmental Protection Service

**LOCATION OF WORK- CA**

**SPONSORING AGENCY-** Canadian Association of Petroleum Producers, Calgary, AB (Canada); Environment Canada, Burlington, ON (Canada). Wastewater Technology Centre; Natural Sciences and Engineering Research Council of Canada, Ottawa, ON (Canada); Shell Research Ltd., Chester (United Kingdom). Thornton Research Centre

**LITERARY INDICATOR(S)-** Conference

**REPORT NUMBER(S)-** CONF-951086--

**SUBFILE CODE-** CANM

**PUBLISHER-** Environment Canada - Environmental Protection Service

**PUBLICATION PLACE-** Hull, PQ (Canada)

**PUBLICATION COUNTRY- CA**

**CONFERENCE DATE-** 2-6 Oct 1995

**CONFERENCE TITLE-** 5. annual symposium on groundwater and soil remediation

**CONFERENCE LOCATION-** Toronto (Canada)

**ANNOUNCEMENT CODE-** EDB; ETD

**CORPORATE ENTRY CODE-** 2133360

**INCOMING TAPE SERIAL NUMBER-** CA9700890

**ANNOUNCEMENT IDENTIFICATION** CANM-97-000890; EDB-97-063079

**LANGUAGE-** English

A modified version of the funnel and gate technology used for the remediation of high hydraulic conductivity media (i.e. sand and gravel) was assessed for use with low hydraulic conductivity media, such as hydrocarbon-contaminated groundwater hosted by fine-grained glacial deposits (e.g. silt and clay tills). A pilot-scale system, termed 'trench and gate' was designed for installation at the Amoco-operated East Garrington Gas Plant in Alberta. The theoretical background, site history, hydrogeologic setting, contaminant sources and concentrations, design considerations and construction techniques, and advantages of the trench and gate system were described. Preliminary findings suggest that while the trench and gate system may be useful in certain applications, it is not cost-effective for treating very wide or deep contaminant plumes.

**DESCRIPTOR(S) -** \*HYDROAROMATICS; \*SOILS CONTAMINATION; GROUND WATER; HYDRAULIC CONDUCTIVITY; WATER POLLUTION  
**IDENTIFIER(S)-** HYDROGEN COMPOUNDS; ORGANIC COMPOUNDS; OXYGEN COMPOUNDS; POLLUTION; WATER

**SECTIONAL CLASSIFICATION CODE-** 540320

---

**6. The conductivity of low concentration of CO sub 2 dissolved in water from 0-60 degree C**

EDB 95-24 95:157121 95001490562 NDN- 108-0619-7563-5

Light, T. S.; Kingman, B.; Bevilacqua, A. C., (Thornton Associates, Waltham, MA (United States))

1995

PP. 145, Paper ANYL 66

2088 page(s)

**DOCUMENT TYPE-** Book Analytic**MONOGRAPH TITLE-** 209th ACS national meeting**AUTHOR AFFILIATION-** Thornton Associates, Waltham, MA (United States)**LOCATION OF WORK-** US**LITERARY INDICATOR(S)-** Conference**REPORT NUMBER(S)-** CONF-950402--**SUBFILE CODE-** IIA**PUBLISHER-** American Chemical Society**PUBLICATION PLACE-** Washington, DC (United States)**PUBLICATION COUNTRY-** US**CONFERENCE DATE-** 2-6 Apr 1995**CONFERENCE TITLE-** 209. American Chemical Society (ACS) national meeting**CONFERENCE LOCATION-** Anaheim, CA (United States)**ANNOUNCEMENT CODE-** EDB; ETD**INCOMING TAPE SERIAL NUMBER-** 95:006086-0073**ANNOUNCEMENT IDENTIFICATION-** EDB-95:157121**LANGUAGE-** English

It is often necessary to measure the impurity content of water, as distinguished from impurities formed from its exposure to natural atmospheric components, carbon dioxide in particular. In the pharmaceutical, semiconductor, power generation, and food/beverage industries, ultrapure water is often exposed to air thereby increasing its conductivity and giving the appearance of a contaminant in the water. On-line conductivity instrumentation is used to measure low-level ionic impurities. For theoretically pure water at 25.0 degree C, the conductivity is 0.055 mu S/cm; for 1 ppb of NaCl, 0.057 mu S/cm. For aerated pure water, the conductivity varies from 0.8-1.5 mu S/cm, depending on the concentration of CO sub 2 in air which normally ranges from 0.03-0.1%. This conductivity increase is due to the formation of the weak acid, H sub 2 CO sub 3 resulting from dissolved CO sub 2 in water. A model has been developed to predict the conductivity of CO sub 2 over the range of 0-100 degree C and 0.0-1% CO sub 2 in air, with knowledge of the following physical constants: Henry's Law constant for CO sub 2 , acid dissociation constants for H sub 2 CO sub 3 , K sub w for water, and ion mobilities for H sup + , OH sup - , HCO sub 3 sup - , and CO sub 3 sup 2- . This model has been tested by measuring the conductivity of theoretically pure water exposed to known concentrations of CO sub 2 . The agreement between the model and experimental results over the range of 0-60 degree C is better than 5%. It is interesting to note that the conductivity of pure water and aqueous solutions normally increases with increasing temperature. However, the conductivity for CO sub 2 solutions is at its maximum at -45 degree C, despite increasing ion mobility, due to the decreasing solubility of CO sub 2 at elevated temperatures.

**DESCRIPTOR(S) -** \*AQUEOUS SOLUTIONS --Electric conductivity ; \*CARBON DIOXIDE --Electric conductivity ; DISSOCIATION; IMPURITIES; ION MOBILITY; SOLUBILITY; TEMPERATURE DEPENDENCE IDENTIFIER(S)- CARBON COMPOUNDS; CARBON OXIDES; CHALCOGENIDES; DISPERSIONS; ELECTRICAL PROPERTIES; MIXTURES; MOBILITY; OXIDES; OXYGEN COMPOUNDS; PARTICLE MOBILITY; PHYSICAL PROPERTIES; SOLUTIONS

**SECTIONAL CLASSIFICATION CODE-** 400400

**7. Effect of oxide thickness on the properties of metal-insulator-organic semiconductor photovoltaic cells**

EDB 93-18 93:112514 93001041900 NDN- 108-0582-2694-5

Nevin, W. A., (Trent Polytechnic, Nottingham (United Kingdom). Dept. of Electrical and Electronic Engineering); Chamberlain, G. A., (Shell Research Ltd., Chester (United Kingdom). Thornton Research Centre)

**JOURNAL NAME** - IEEE Transactions on Electron Devices (Institute of Electrical and Electronics Engineers) (United States)

**ABBREVIATED JOURNAL TITLE** - IEEE Trans. Electron Devices

**VOL.** 40

**NO. 1**

1993-01

**PP.** 75-81

**DOCUMENT TYPE** - Journal Article

**ISSN** - 0018-9383

**CODEN** - IETDAI

**AUTHOR AFFILIATION** - Trent Polytechnic, Nottingham (United Kingdom). Dept. of Electrical and Electronic Engineering; Shell Research Ltd., Chester (United Kingdom). Thornton Research Centre

**LOCATION OF WORK** - GB

**LITERARY INDICATOR(S)** - Numerical Data

**SUBFILE CODE** - IMS

**PUBLICATION COUNTRY** - US

**ANNOUNCEMENT CODE** - EDB; ETD

**INCOMING TAPE SERIAL NUMBER** - IM9314%%205

**ANNOUNCEMENT IDENTIFICATION** - EDB-93:112514

**LANGUAGE** - English

The dependence of the dark and photovoltaic characteristics of metal-insulator-semiconductor (MIS) devices of the structure Al/Al-oxide/TPP/Au (TPP = tetraphenylporphyrin) on the thickness of the interfacial oxide layer is described. Iodine-doped MgTPP devices show a variation of open-circuit photovoltage, short-circuit photocurrent, fill factor, power conversion efficiency, and capacitance with Al-oxide thickness, in a manner similar to inorganic MIS structures. An optimum oxide thickness of around 2 nm is observed for highest photovoltaic efficiency. The properties of oxygen/water vapor-doped ZnTPP and H sub 2 TPP cells appear dependent upon the extent of oxide growth on the aluminum electrode during the doping process.

**DESCRIPTOR(S)** - \*MIS SOLAR CELLS --Electrical properties ALUMINIUM; ALUMINIUM OXIDES; ELECTRIC POTENTIAL; ENERGY EFFICIENCY; EXPERIMENTAL DATA; FILL FACTORS; GOLD; ORGANIC COMPOUNDS; OXIDES; OXYGEN; PHOTOCONDUCTIVITY; PORPHYRINS; SEMICONDUCTOR MATERIALS; THICKNESS; WATER IDENTIFIER(S)- ALUMINIUM COMPOUNDS; CARBOXYLIC ACIDS; CHALCOGENIDES; DATA; DIMENSIONS; DIRECT ENERGY CONVERTERS; EFFICIENCY; ELECTRIC CONDUCTIVITY; ELECTRICAL PROPERTIES; ELEMENTS; EQUIPMENT; HETEROCYCLIC ACIDS; HETEROCYCLIC COMPOUNDS; HYDROGEN COMPOUNDS; INFORMATION; MATERIALS; METALS; NONMETALS; NUMERICAL DATA; ORGANIC ACIDS; ORGANIC COMPOUNDS; ORGANIC NITROGEN COMPOUNDS; OXIDES; OXYGEN COMPOUNDS; PHOTOELECTRIC CELLS;

PHOTOVOLTAIC CELLS; PHYSICAL PROPERTIES; SOLAR CELLS; SOLAR EQUIPMENT;  
TRANSITION ELEMENTS  
SECTIONAL CLASSIFICATION CODE- 140501

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Citations from ENGINEERING INDEX: EIX

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**8 . Effect of temperature, temperature error, and impurities on compensated conductivity measurements**

EIX 97-29 EIX97293665695 NDN- 017-02/4-6840-2

Bevilacqua, A.C.

Conference Proceedings - Annual Semiconductor Pure Water and Chemicals Conference v 1 1997. Balazs Analytical Laboratory, Sunnyvale, CA, USA. p 131-160

1997

**DOCUMENT TYPE-** CA, Conference Article

**CODEN-** CPWCEB

**AUTHOR AFFILIATION-** Thornton Associates, Inc, Waltham, MA, USA

**CONFERENCE DATE-** 19970303-19970307

**CONFERENCE TITLE** - Proceedings of the 1997 16th Annual Semiconductor Pure Water and Chemicals, SPWCC. Part 1 (of 2)

**CONFERENCE LOCATION-** Santa Clara, CA, USA

**CONFERENCE CODE NO.-** 46405

**JOURNAL NAME** - Conference Proceedings - Annual Semiconductor Pure Water and Chemicals Conference

**LANGUAGE-** English

The use of pure ( less than 1 mu S/cm, greater than 1 M Omega -cm) and ultrapure ( greater than 18 M Omega -cm) water has long been required for its cleansing ability and the need for defect-free semiconductors. In particular, hot ultrapure water has been shown to be cost effective, where the benefits of self-sanitization and improved rinsing ability overshadow the cost of heated water. Modern resistivity instrumentation provides a resistivity and temperature measurement in a single sensor, and the meter possesses microprocessor-controlled algorithms to calculate temperature-compensated resistivity/conductivity. Despite continual improvements in instrument and sensor performance, the reduced sensitivity of resistivity measurements at higher temperatures complicates the monitoring of hot UPW. We have re-measured the resistivity of ultrapure water, with emphasis on the 60-100 degree C range, and we have verified our measurements by re-calculating the resistivity of double prime theoretically double prime pure water. We have also examined the effects of temperature, resistivity, and impurity error and their impact on system performance for compensated measurements. For example, at 25 degree C, the resistivity of UPW decreases by 4.0% when 1.0 mu g/L (ppb) of NaCl impurity is present (8.5% when 1 ppb of HCl impurity is present). However, at 85 degree C, the resistivity of the same water decreases less than 1.0% (1.9% for HCl). (Author abstract) 12 Refs.

**DESCRIPTOR(S)** - Electric conductivity measurement; Impurities; Industrial water treatment; Semiconductor device manufacture; Water analysis; Water quality

**IDENTIFIER(S)**- Ultra pure water

**TREATMENT CODE-** TC-X (Experimental); TC-A (Applications)  
**SECTIONAL CLASSIFICATION CODE -** CAL701.1; CAL942.2; CAL714.2; CAL445.1.2;  
CAL445.2; CAL801  
**SECTION HEADING-** Electric conductivity of liquids

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Citations from Engineering Index (1983-1989): EI1

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**9. EVALUATION AND PREVENTION OF ELECTROSTATIC HAZARDS ASSOCIATED WITH OIL TANKER OPERATIONS. PART 3: HAZARDS ASSOCIATED WITH THE SHIPBOARD USE OF GLASS FIBER REINFORCED PLASTIC (GRP) PIPES.**  
EIX 84-11 EIX84110191241 NDN- 163-0155-1782-0

Mills, J. S.; Oldham, R. C.

Fire Prev n 168 Apr 1984 p 27-32  
1984

**ISSN-** 0309-6866

**CODEN-** FPRVD7

**AUTHOR AFFILIATION-** Shell Research Ltd, Thornton Research Cent, Chester, Engl

**PATENT REFERENCE(S)-** Fire Prevention

**FOREIGN DOCUMENT REFERENCE(S)-** 128261

**PATENT STATUS INFO-** 125239

**LANGUAGE-** English

Some operations on board oil tankers can generate electrostatic charges and hazardous situations are created if a charge is released in a flammable atmosphere. This paper, which is published in three parts, reviews the current body of knowledge on electrostatic hazards in the marine environment and describes recent investigations carried out by Shell Research Limited into potential electrostatic hazards on crude oil and products carriers. 6 refs.

**DESCRIPTOR(S) -** ELECTROSTATICS --Electric Charge; PIPE --Electric Properties; PLASTICS, REINFORCED --Glass Fiber

**IDENTIFIER(S)-** OIL ELECTRICAL CONDUCTIVITY; PIPE COUPLINGS

**SECTIONAL CLASSIFICATION CODE-** CAL671; CAL914; CAL701; CAL817; CAL619

**SECTION HEADING-** TANKERS --Fire Prevention

---

**10. PREPARATION OF PYROGRAPHITE-COATED CARBON PAPER BY PYROLYSIS OF METHANE ON RESISTIVELY HEATED CELLULOSE-BASED CARBON PAPER.**

EIX 84-07 EIX84070112188 NDN- 163-0147-2729-6

Attwood, P. A.; Dixon, A. G.; Houston, A. C.; Short, R. T.

J Chem Technol Biotechnol Chem Technol v 34A n 1 Jan 1984 p 10-20

1984

CODEN- JCTTDW

AUTHOR AFFILIATION- Shell Research Ltd, Thornton Research Cent, Chester, Engl

PATENT REFERENCE(S)- Journal of Chemical Technology and Biotechnology, Chemical Technology

FOREIGN DOCUMENT REFERENCE(S)- 052107

PATENT STATUS INFO- 066100

LANGUAGE- English

A laboratory technique has been developed for depositing a layer of pyrographite on to a cellulose-based carbon-fiber paper substrate by direct resistive heating in a methane/argon atmosphere, thereby enhancing its electrical conductivity and mechanical strength. The material can be used as a support for methanol electro-oxidation catalysts and has proved to be a satisfactory replacement for a proprietary material which is no longer available. 11 refs.

DESCRIPTOR(S)- METHANE; METHANOL

IDENTIFIER(S)- CARBON PAPER

SECTIONAL CLASSIFICATION CODE- CAL702; CAL522; CAL804; CAL523

SECTION HEADING- FUEL CELLS --Electrolytes

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Citations from U.S. Patent Bibliographic Database: PA4

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## 11. RESISTANCE MEASURING BRIDGE CIRCUIT INCLUDING OUTPUT GATING MEANS

PA1 71-04-27 03576491 NDN- 103-0001-7474-7

INVENTOR(S)- THORNTON, R. D.

PATENT NUMBER- 03576491

DATE FILED- 1968-08-12

PATENT DATE- 1971-04-27

NUMBER OF CLAIMS- 5

PATENT ASSIGNEE(S)- THORNTON ASSOCIATES, INC.

ASSIGNEE ADDRESS- WALTHAM MA

U.S. PATENT CLASS- 3240620000; 328097000X

INTERNATIONAL PATENT CLASS- 01R02702

PATENT REFERENCED BY- 05317275

CONCORD MA

•IN A CONDUCTIVITY BRIDGE A SWITCHING SYSTEM IS EMPLOYED TO ALLOW ONLY SELECTED PORTIONS OF THE BRIDGE OUTPUT SIGNAL TO PASS THROUGH THE OUTPUT INDICATOR METER. MORE SPECIFICALLY, INITIAL PORTION OF THE SIGNAL WAVEFORM OUTPUT, CORRESPONDING TO THE TIME DURING WHICH THE STRAY CAPACITANCE IN THE CIRCUIT IS BECOMING FULLY CHARGED, IS PREVENTED FROM PASSING THROUGH THE METER, THEREBY ELIMINATING THE EFFECT OF SUCH CAPACITANCE IN THE CIRCUIT AND THUS YIELDING A MORE ACCURATE MEASUREMENT OF AN UNKNOWN RESISTANCE.

NO-DESCRIPTORS

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Citations from USG/NTIS: USG

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**12. Electrostatic Charging in Reticulated Foam.**

USG 81-00 AD-A098 526/7 NDN- 059-0084-6744-6

Mills, J. S.

Mar 81

100p page(s)

DOCUMENT TYPE- Final rept. Feb-Dec 79.

CORPORATE AUTHOR- Shell Research Ltd., Chester (England). Thornton Research Centre.

CORPORATE AUTHOR CODE- 023952001 349750

SPONSOR- Air Force Wright Aeronautical Labs., Wright-Patterson AFB, OH.

MONITOR- AFWAL, TR-81-2015

CONTRACT/GRANT NUMBER- Contract F33615-78-C-2042

PROJECT NUMBER(S)- 3048

TASK NUMBER(S)- 05

NTIS PRICE(S)- PC A05, MF A01

ISSUE OF ORIGINATION- u8118

Experiments were carried out to determine the effect of a number of parameters on electrostatic charging inside reticulated-foam-filled aircraft fuel tanks during refueling operations. Tests with anti-static additives showed that a fuel conductivity of approximately 50 pS/m is sufficient to suppress all sparking provided fuel systems are designed so that fuel with a high discharge velocity is not directed into the foam. (Author)

**DESCRIPTOR(S)**- \*Fuel tanks; \*Electrostatic charge; \*Refueling; \*Fuel additives; \*Foam; Aircraft; Jet engine fuels; Electrical conductivity; Reticular formation; Electric charge; Electric discharges; Polyurethane resins; Polyethers; Polyester plastics; Blue(Color); Orange(Color); Red(Color); Aviation safety

**IDENTIFIER(S)** - \*Foreign technology; Shell ASA-3 antistatic fuel additives; Dupont stadis-450 antistatic fuel additives

**NTIS SUBJECT CATEGORY CODE(S)**- 21D; 1C; 81C; 51C; 97K

Strategy No.: 01 Strategy Date: 04/04/00 TS: LCS Hit Limit: 555 Copies: 1

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*Citations from RSC ANALYTICAL ABSTRACT: AAN*

1. NDN 096-0009-2247-4. Calculation of detection limits for a single-laboratory ion-chromatographic method to determine parts-per-trillion ions in ultra-pure water.
2. NDN 096-0005-1086-0. Determination of anions at the ng/l level by means of switching valves to eliminate the water-dip interference.
3. NDN 096-0000-7636-8. Separation and detection of group I and II cations by ion chromatography.

*Citations from CAS - COMBINED DIVISIONS: CAS*

4. NDN 127-0310-7860-0 Calibration of a conductivity measuring cell for use with ultrapure water

CAS SECTION- 161

CAS SUBSECTION- 003

*Citations from CAS - COMBINED DIVISIONS: CA1*

5. NDN 171-0029-8548-2 Measuring conductivity of high-purity water

CAS SECTION- 161

CAS SUBSECTION- 007

*Citations from CA SEARCH (90-94): CA2*

6. NDN 010-0424-2091-0: TEMPERATURE-COMPENSATED CONDUCTIVITY : A NECESSITY FOR MEASURING HIGH-PURITY WATER

CAS SECTION- 161

CAS SUBSECTION- 007

7. NDN 010-0380-3981-3: MEASUREMENT OF ELECTRIC CONDUCTIVITY OF ULTRAPURE WATER

CAS SECTION- 161

CAS SUBSECTION- 003

8. NDN 010-0363-7890-2: TESTING METHODS FOR ELECTRIC CONDUCTIVITY OF HIGH PURITY WATER

CAS SECTION- 161

CAS SUBSECTION- 000

*Citations from CA SEARCH (85-89): CA3*

9. NDN 152-0536-1806-2: DETERMINATION OF WATER QUALITY BY CONDUCTIVITY.. DETERMINATION IN ULTRAPURE WATERS AND ITS PRECISION AND RELIABILITY IN THE RANGE OF 0.01 S-M

CAS SECTION- 161

CAS SUBSECTION- 007

10. NDN 152-0483-4759-0: CONDUCTIVITY MEASUREMENT OF HIGH-PURITY WATER IN POWER PLANTS

CAS SECTION- 161

CAS SUBSECTION- 003

11. NDN 152-0483-4548-8: ADVANCES IN HIGH PURITY WATER CONDUCTIVITY MEASUREMENT IN THE POWER INDUSTRY

CAS SECTION- 161

CAS SUBSECTION- 000

12. NDN 152-0403-9005-5: A REVIEW OF PH AND CONDUCTIVITY MEASUREMENT TECHNIQUES IN HIGH PURITY WATER, WITH BIBLIOGRAPHY

CAS SECTION- 161

CAS SUBSECTION- 000

13. NDN 152-0364-9652-1: INSTRUMENTATION, CONDUCTIVITY AND PH MEASUREMENTS IN HIGH PURITY WATER

CAS SECTION- 161

CAS SUBSECTION- 000

14. NDN 152-0343-1650-3: MEASUREMENT OF CONDUCTIVITY IN HIGH PURITY WATER

CAS SECTION- 161

CAS SUBSECTION- 003

15. NDN 152-0337-7872-2: PROCEDURE FOR THE MEASUREMENT OF THE CONDUCTIVITY OF HIGH-PURITY WATER

CAS SECTION- 161

CAS SUBSECTION- 003

*Citations from CA SEARCH (75-79): CA5*

16. NDN 154-0454-4787-9: ELECTROLYTIC CONDUCTIVITY MEASUREMENT OF HIGH PURITY WATER

CAS SECTION- 061

CAS SUBSECTION- 002

*Citations from ENGINEERING INDEX: EI*

17. NDN 017-0291-0753-6: Cell constant documented continuous conductivity measurements in ultrapure water measurements

18. NDN 017-0274-6840-2: Effect of temperature, temperature error, and impurities on compensated conductivity measurements

19. NDN 017-0253-4386-9 Test results for a heat-treated 4-cell 805-MHz superconducting cavity

20. NDN 017-0250-9888-7: On-line boiler and condensate measurements : conductivity, pH, and dissolved oxygen

*Citations from European Patent Applications: EPA*

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21. NDN 050-0017-1344-9 Instrument for potentiometric electrochemical measurements in earth grounded solutions. PUBLICATION NUMBER- 0280230

*Citations from European Patent Granted: EPB*

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22. NDN 069-0321-5025-0 IMPROVED TECHNIQUE FOR THE MEASUREMENT OF HIGH PURITY WATER PATENT NUMBER- 0429439

*Citations from INSPEC: INS*

23. NDN 174-0631-8060-9: A technique for in situ measurement of the conductivity of water in

'triple point of water' cells

*Citations from Patent Abstracts of Japan: PAJ*

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24. NDN 043-0149-0465-0 **MEASURING METHOD FOR ELECTROLYTE ELUTABILITY OF SAMPLE, AND OPTICL DISK** PUBLICATION NUMBER- 11223613 JP

25. NDN 013 0136 8658 3: **TOTAL CARRONIC ACID CONCENTRATION MEASURING APPARATUS, ULTRAPURE-WATER PREPARATION APPARATUS PROVIDED WITH THE SAME AND PREPARATION OF ULTRAPURE WATER** PUBLICATION NUMBER- 11101761 JP

26. NDN 043-0123-2475-6: **UNDERWATER TOC MONITOR** PUBLICATION NUMBER- 10307114 JP

27. NDN 043-0046-7749-0: **WATER-QUALITY MONITOR AND WATER-QUALITY MONITORING METHOD** PUBLICATION NUMBER- 08166378 JP

28. NDN 043-0046-7748-9: **WATER-QUALITY MONITOR AND WATER-QUALITY MONITORING METHOD** PUBLICATION NUMBER- 08166377 JP

29. NDN 043-0023-9545-6: **ORGANIC CARBON MEASURING DEVICE, AND ULTRAPURE WATER PRODUCING DEVICE WITH THE DEVICE BUILT-IN** PUBLICATION NUMBER- 07260725 JP

*Citations from U.S. Patent Bibliographic Database: PA2*

To request FREE copies of the following Patents: Go to the Customer Access area of [www.nerac.com](http://www.nerac.com) and click on Search Results or Full Image Patents. Or email the NDNs or the PATENT NUMBERs to [patents@mail.nerac.com](mailto:patents@mail.nerac.com) Or fax the NDNs or the PATENT NUMBERs to: 860/ 872-6026 Or telephone us at 860/872-7000

30. NDN 167-0149-1094-3: **Instrument for potentiometric electrochemical measurements** PATENT NUMBER- 04851104

31. NDN 167-0144-1622-5: **Rugged dissolved carbon dioxide monitor for high purity water** PATENT NUMBER- 04801551

32. NDN 167-0140-2199-1: **Apparatus for measuring content of organic carbon** PATENT NUMBER- 04769217

33. NDN 167-0129-3477-4 **Instrument for measurement of the organic carbon content of water** PATENT NUMBER- 04666860

*Citations from PATENT ABSTRACTS OF JAPAN: PJI*

To request an English Summary possibly containing a diagram of the following Japanese Unexamined Patent Applications: Go to the Customer Access area of [www.nerac.com](http://www.nerac.com) and click on Search Results or Full Image Patents. Or email the NDNs or the PUBLICATION NUMBERs to [patents@mail.nerac.com](mailto:patents@mail.nerac.com) Or fax the NDNs or the PUBLICATION NUMBERs to: 860/872-6026 Or telephone us at 860/872-7000

34. NDN 190-0168-4226-2: **METHOD AND SYSTEM FOR DETECTING SALINITY**  
PUBLICATION NUMBER- 06194350 JP

*Citations from PATENT ABSTRACTS OF JAPAN: PJ2*

To request an English Summary possibly containing a diagram of the following Japanese Unexamined Patent Applications: Go to the Customer Access area of [www.nerac.com](http://www.nerac.com) and click on Search Results or Full Image Patents. Or email the NDNs or the PUBLICATION NUMBERs to [patents@mail.nerac.com](mailto:patents@mail.nerac.com) Or fax the NDNs or the PUBLICATION NUMBERs to: 860/872-6026 Or telephone us at 860/872-7000

35. NDN 075-0234-8557-2: **CONDUCTIVITY METER FOR ULTRAPURE WATER**  
PUBLICATION NUMBER- 57082776 JP

*Citations from PATENT ABSTRACTS OF JAPAN: PJ3*

36. NDN 198-0234-8557-0: **CONDUCTIVITY METER FOR ULTRAPURE WATER**  
PUBLICATION NUMBER- 57082776 JP

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Citations from RSC ANALYTICAL ABSTRACT: AAN

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**1 Calculation of detection limits for a single-laboratory ion-chromatographic method to determine parts-per-trillion ions in ultra-pure water .**

AAN 59-09 AAN5909E00083 NDN- 096-0009-2247-4

Vanatta, L. E.; Coleman, D. E.

**JOURNAL NAME-** Journal of Chromatography, A

**VOL.** 770

**NO.** 1-2

1997-05-16

**PP.** 105-114

**DOCUMENT TYPE-** Journal

**ISSN-** 0021-9673

**CODEN-** JCRAEY

**AUTHOR AFFILIATION-** Texas Instruments, Dallas, TX 75265, USA

**SECTION CROSS-REFERENCE CODE-** B3

**SECTION CROSS-REFERENCE** - Chromatography and Electrophoresis, Liquid column chromatography including ion chromatography and ion-exchange

**CONFERENCE INFORMATION-** Presented at the 9th International Ion Chromatography Symposium 1996, held at the University of Reading, Reading, UK, 16-19 Sep 1996

**ORIGINAL LANGUAGE-** English  
**LANGUAGE-** English

Standards containing 25, 37.5, 50, 62.5, 75, 100, 150 and 200 parts per 10<sup>12</sup> each of fluoride, chloride, bromide, nitrate, nitrite, sulfate and phosphate were prepared. Portions (12 ml) were applied to a TAC-LP1 concentrator column (3.5 cm times 4 mm i. d.) at 0.75 ml/min, and the anions were eluted on to an IonPac AG11 guard column (5 cm times 2 mm i. d.) and IonPac AS11 analytical column (25 cm times 2 mm i. d.) for separation with a gradient of 0.5-38.15m M -NaOH, with use of a self-regenerating ASRS-1 suppressor column (2 mm) and conductivity detection. Two methods of calculating the detection limits were used, viz, the 3 small alpha method and the method of Hubaux and Vos (Anal. Chem., 1970, 42, 849). The Hubaux and Vos method gave the higher and more realistic values for the detection limits, ranging from 18 to 80 parts per 10<sup>12</sup>. With the assumption of false positives and false negatives having probabilities of less or equal 10%, it is concluded that the method is not suitable for determining the anions at the 50 parts per 10<sup>12</sup> level.

**ANALYTE INDEX-** ions --detmn. of, in high-purity water, by ion chromatography, detection limits in

**CONCEPT INDEX-** chromatography, ion --in detmn. of ions in high-purity water, detection limits in

**MATRIX INDEX-** water, high-purity --detmn. of ions in, by ion chromatography, detection limits in

**SECTION HEADING CODE-** E10000

**SECTION HEADING-** Applied and Industrial analysis, Inorganic industrial products including ceramics, glass, construction materials, catalysts and semiconductors

**2. Determination of anions at the ng/l level by means of switching valves to eliminate the water-dip interference.**

AAN 56-12 AAN5612D00012 NDN- 096-0005-1086-0

Kumagai, H.; Sakai, T.; Matsumoto, K.; Hanaoka, Y.

**JOURNAL NAME-** J. Chromatogr. A

**VOL.** 671

**NO.** 1-2

10 Jun 1994

**PP.** 15-22

**DOCUMENT TYPE-** Journal Article

**ISSN-** 0021-9673

**CODEN-** JCRAEY

**CORPORATE AUTHOR-** Yokogawa Analytical Systems Inc., R&D Section

**ADDRESS-** Tokyo 180

Japan

**CONFERENCE TITLE** - Presented at the International Ion Chromatography Symposium, held in Baltimore, MD, USA, September 12-15, 1993.

**LANGUAGE-** English

An ion-chromatographic analyser with a conductivity detector and automatic switching six-port valves was employed. Anions were determined in matrices such as ultra-pure water by passing the sample to a concentrator column of Excelpak ICS-ANC for 5-20 min and eluting the anions with 4mM-Na<sub>2</sub>CO<sub>3</sub>/4mM-NaHCO<sub>3</sub> at 1 ml/min. A water-dip cutting column of Excelpak ICS-A44 was used

to separate chloride and anions eluting after it from H<sub>2</sub>O and early-eluting anions. Chloride and the late-eluting anions were passed through a separation column (15 cm.times. 4.9 mm i.d.) of Excelpak ICS-A44; all columns were at 40.degree. C. The detection limit for chloride was 2 ng/l at a signal-to-noise ratio of 3 and the RSD for 0.5.mu.g/l of chloride were 1.2% (peak area) and 0.8% (peak height). The calibration graph was linear in the range 0.1-1.mu.g/l for chloride and sulfate. Results are presented for the determination of chloride, nitrite, bromide, nitrate, phosphate and sulfate at the ng/l level in the recycling water of a power generation plant boiler system, semiconductor washing water, washing water of an **ultra-pure** water delivery system and CO<sub>2</sub> for the electronics industry.

**CAS REGISTRY/EC NUMBER(S)**- 16887-00-6; 14797-65-0; 24959-67-9; 14797-55-8; 14265-44-2; 14808-79-8

**ANALYTE INDEX**- anions --detmn. of, in high-purity water, by ion chromatography; chloride --detmn. of, in high-purity water, by ion chromatography; nitrite --detmn. of, in high-purity water, by ion chromatography; bromide --detmn. of, in high-purity water, by ion chromatography; nitrate --detmn. of, in high-purity water, by ion chromatography; phosphate --detmn. of, in high-purity water, by ion chromatography; sulfate --detmn. of, in high-purity water, by ion chromatography

**CONCEPT INDEX**- chromatography, ion --in inorganic analysis; chromatography, ion --in inorganic industrial analysis

**MATRIX INDEX**- water, high-purity --detmn. of anions in, by ion chromatography

**SECTIONAL CLASSIFICATION CODE**- D10000

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### 3. Separation and detection of group I and II cations by ion chromatography.

AAN 54-06 AAN5406D00025 NDN- 096-0000-7636-8

Campbell, D. L.; Stillian, J.; Carson, S.; Joyce, R.; Heberling, S.

**JOURNAL NAME**- J. Chromatogr.

**VOL.** 546

**NO.** 1-2

21 Jun 1991

**PP.** 229-242

**DOCUMENT TYPE**- Journal Article

**ISSN**- 0021-9673

**CODEN**- JOCRAM

**CORPORATE AUTHOR**- Dionex Corp.

**ADDRESS**- Sunnyvale, CA 94086

USA

**CONFERENCE TITLE**- Presented at the International Ion Chromatography Symposium 1990 held in San Diego, CA, USA, on 30 Sep to 3 Oct 1990

**LANGUAGE**- English

Separation of mono- and bi-valent cations was carried out with use of a Dionex Series 4500i equipped with CG3 guard columns, Fast Cation I and Fast Cation II analytical columns, a cation micro-membrane suppressor and a conductivity detector. The eluent (2 ml min.minus.1) was 13.5mM-HCl with 0.23mM-2,3-diaminopropionic acid hydrochloride and the regenerant soln. was 100mM-tetrabutylammonium hydroxide. The Fast Cation II column was placed before the CG3/Fast Cation I columns and column switching was carried out 1.25 min after injection to allow separation of

monovalent cations on the CG3/Fast Cation I columns and bivalent cations on the Fast Cation II column. Results are presented for the determination of cations in **ultra-pure** water, in power plant water containing NH<sub>3</sub> (1 ppm), power plant water containing  $\text{HBO}_3$  and power plant water containing  $\text{morpholine}$ .

**ANALYTE INDEX** - cations --detmn. of mono- and bi-valent, by ion chromatography; alkali metals --detmn. of, by ion chromatography; alkaline-earth metals --detmn. of, by ion chromatography

**MATRIX INDEX** - water, high-purity --detmn. of mono- and bi-valent cations in, by ion chromatography; waters, industrial --detmn. of mono- and bi-valent cations in, by ion chromatography

**SECTIONAL CLASSIFICATION CODE** - D10000

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Citations from CAS - COMBINED DIVISIONS: CAS

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**4. Calibration of a conductivity measuring cell for use with ultrapure water**

**CAS SECTION** - 161

**CAS SUBSECTION** - 003

CAS 130-23 130-316316 130:316316 NDN- 127-0310-7860-0

Riegel, Harald

**ABBREVIATED JOURNAL TITLE** - Chem.-Ing.-Tech.

**VOL.** 71

**NO.** 4

1999

**PP.** 348-352

**DOCUMENT TYPE** - Journal

**ISSN** - 0009-286X

**CODEN** - CITEAH

**CORPORATE AUTHOR** - Endress & Hauser CONDUCTA, Gerlingen, DE, Germany, D-70839

**SUBFILE CODE** - APP

**PUBLISHER** - Wiley-VCH Verlag GmbH

**SECTION CROSS-REFERENCE** - 0000100003176

**LANGUAGE** - Ger

Copyright 2000 by American Chemical Society

**NO-ABSTRACT**

**IDENTIFIER(S)** - **ultrapure water** cond measurement cell calibration

**CAS REGISTRY/EC NUMBER(S)** - 7732-18-5 **HEADING PARENT** - Water

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Citations from CAS - COMBINED DIVISIONS: CA1

**5. Measuring conductivity Y of high-purity water"**

**CAS SECTION- 161**

**CAS SUBSECTION- 007**

CAS 122-12 122-298561 122:298561 NDN- 171-0029-8548-2

Harfst, William F.

**ABBREVIATED JOURNAL TITLE-** Ultrapure Water

**VOL. 12**

**NO. 2**

1995

**PP. 53-5**

**DOCUMENT TYPE-** Journal

ISSN- 0747-8291

**CODEN-** ULWAE5

**CORPORATE AUTHOR-** Harfst and Associates, US, USA

**SUBFILE CODE-** APP

**SECTION CROSS-REFERENCE-** 0000100003176

**LANGUAGE-** Eng

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**NO-ABSTRACT**

**IDENTIFIER(S)-** elec cond detn high purity water

**CAS REGISTRY/EC NUMBER(S)-** 7732-18-5 **HEADING PARENT-** Water

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Citations from CA SEARCH (90-94): CA2

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**6. TEMPERATURE-COMPENSATED CONDUCTIVITY- A NECESSITY FOR MEASURING HIGH-PURITY WATER**

**CAS SECTION- 161**

**CAS SUBSECTION- 007**

CAS 116-10 116-200795 CA 116:200795 NDN- 010-0424-2091-0

ZABARSKY, OSCAR

ULTRAPURE WATER, 1992, VOL.9, ISS.1, PP.56-60

**DOCUMENT TYPE-** JOURNAL

**CODEN-** ULWAE5

**LOCATION OF WORK-** MARTEK INSTRUM. INC., IRVINE, CA 92713, USA

**SUBFILE CODE- APP**

**LANGUAGE- ENGLISH**

Copyright 2000 by American Chemical Society

NO-ABSTRACT

**DESCRIPTOR(S)- TEMP COMPENSATED COND HIGH PURITY WATER ; ELECTROLYTE CONCN COND HIGH PURITY WATER , MICROPROCESSOR CONTROLLED INSTRUMENT COND MEASUREMENT**

**CAS REGISTRY/EC NUMBER(S)- 7732-18-5**

---

**7. MEASUREMENT OF ELECTRIC CONDUCTIVITY OF ULTRAPURE WATER**

**CAS SECTION- 161**

**CAS SUBSECTION- 003**

CAS 115-03 115-056774 CA 115:056774 NDN- 010-0380-3981-3

DEGNER, R.; HONOLD, F.

GIT FACHZ. LAB., 1991, VOL.35, ISS.2, PP.119-21

**DOCUMENT TYPE- JOURNAL**

**CODEN- GITEAR**

**LOCATION OF WORK- WISS. TECH. WERKSTAETTEN, APPLIKATION, WEILHEIM W-8120, FED. REP. GER.**

**SUBFILE CODE- APP**

**LANGUAGE- GERMAN**

Copyright 2000 by American Chemical Society

NO-ABSTRACT

**DESCRIPTOR(S)- ELEC COND ULTRAPURE WATER MEASUREMENT**

**CAS REGISTRY/EC NUMBER(S)- 7732-18-5**

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**8. TESTING METHODS FOR ELECTRIC CONDUCTIVITY OF HIGH PURITY WATER**

**CAS SECTION- 161**

**CAS SUBSECTION- 000**

CAS 114-08 114-149570 CA 114:149570 NDN- 010-0363-7890-2

KIKUCHI, TADAYOSHI

KOGYO YOSUI, 1990, ISS.382, PP.19-25

**DOCUMENT TYPE- JOURNAL**

**CODEN- KOYOAW**

**LOCATION OF WORK- DKK CORP., MUSASHINO 180, JAPAN**

**SUBFILE CODE- APP**

**LANGUAGE- JAPANESE**

Copyright 2000 by American Chemical Society

NO-ABSTRACT

**DESCRIPTOR(S)- REVIEW ELEC COND PURE WATER**

**CAS REGISTRY/EC NUMBER(S)- 7732-18-5**

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Citations from CA SEARCH (85-89): CA3

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**9. DETERMINATION OF WATER QUALITY BY CONDUCTIVITY . DETERMINATION IN ULTRAPURE WATERS AND ITS PRECISION AND RELIABILITY IN THE RANGE OF 0.01 S-M**

**CAS SECTION- 161**

**CAS SUBSECTION- 007**

CAS 111-13 111-239262 CA 111:239262 NDN- 152-0536-1806-2

PALAU, J. MARIA

ENERGIA (MADRID), 1989, VOL.15, ISS.4, PP.133-8

**DOCUMENT TYPE- JOURNAL**

**CODEN- ENMAEV**

**LOCATION OF WORK- ANATROL, SPAIN**

**SUBFILE CODE- APP**

**LANGUAGE- SPANISH**

Copyright 2000 by American Chemical Society

NO-ABSTRACT

**DESCRIPTOR(S)- ELEC COND ULTRAPURE WATER**

**CAS REGISTRY/EC NUMBER(S)- 7732-18-5**

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**10. CONDUCTIVITY MEASUREMENT OF HIGH-PURITY WATER IN POWER PLANTS**

**CAS SECTION- 161**

**CAS SUBSECTION- 003**

CAS 109-11 109-196777 CA 109:196777 NDN- 152-0483-4759-0

HUNT, ROBERT C.; BARBEN, TED R.; EATER, LLOYD E.

ADV. INSTRUM., 1987, VOL.42, ISS.1, PP.457-68

**DOCUMENT TYPE- JOURNAL**

**CODEN- AVINBP**

**LOCATION OF WORK- SENSOR DEV., INC., SANTA ANA, CA 92704, USA**

**SUBFILE CODE- APP**

**LANGUAGE- ENGLISH**

Copyright 2000 by American Chemical Society

NO-ABSTRACT

**DESCRIPTOR(S)- COND DETN HIGH PURITY WATER ; POWER PLANT BOILER WATER**

**COND**

**CAS REGISTRY/EC NUMBER(S)- 7732-18-5**

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**11. ADVANCES IN HIGH PURITY WATER CONDUCTIVITY MEASUREMENT IN THE POWER INDUSTRY**

**CAS SECTION- 161**

**CAS SUBSECTION- 000**

CAS 109-11 109-196566 CA 109:196566 NDN- 152-0483-4548-8

GRAY, DAVID M.

ADV. INSTRUM., 1987, VOL.42, ISS.1, PP.451-5

**DOCUMENT TYPE- JOURNAL**

**CODEN- AVINBP**

**LOCATION OF WORK- LEEDS AND NORTHRUP CO , NORTH WALES, PA, USA**

**SUBFILE CODE- APP**

**LANGUAGE- ENGLISH**

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NO-ABSTRACT

**DESCRIPTOR(S)- REVIEW ELEC COND PURE WATER ; HIGH PURITY WATER COND REVIEW**

**CAS REGISTRY/EC NUMBER(S)- 7732-18-5**

---

**12. A REVIEW OF PH AND CONDUCTIVITY MEASUREMENT TECHNIQUES IN HIGH PURITY WATER, WITH BIBLIOGRAPHY**

**CAS SECTION- 161**

**CAS SUBSECTION- 000**

CAS 106-07 106-107488 CA 106:107488 NDN- 152-0403-9005-5

HUNT, ROBERT C.

ULTRAPURE WATER, 1987, VOL.4, ISS.1, PP.26, 28-9, 32-4

**DOCUMENT TYPE- JOURNAL**

**CODEN- ULWAE5**

**LOCATION OF WORK- SENSOR DEV., INC., SANTA ANA, CA 92704, USA**

**SUBFILE CODE- APP**

**LANGUAGE- ENGLISH**

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NO-ABSTRACT

**DESCRIPTOR(S) - REVIEW PH ELEC COND DETN; HIGH PURITY WATER ANALYSIS**

**REVIEW**

**CAS REGISTRY/EC NUMBER(S)- 7732-18-5**

---

**13. INSTRUMENTATION. CONDUCTIVITY AND PH MEASUREMENTS IN HIGH PURITY WATER**

**CAS SECTION- 161**

**CAS SUBSECTION- 000**

CAS 104-11 104-192527 CA 104:192527 NDN- 152-0364-9652-1

HUNT, ROBERT C.

ULTRAPURE WATER, 1986, VOL.3, ISS.2, PP.39, 41-5

**DOCUMENT TYPE- JOURNAL**

**CODEN- ULWAE5**

**LOCATION OF WORK- SENSOR DEV., INC., SANTA ANA, CA 92704, USA**

**SUBFILE CODE- APP**

**LANGUAGE- ENGLISH**

Copyright 2000 by American Chemical Society

NO-ABSTRACT

**DESCRIPTOR(S)- REVIEW COND PH WATER**

**CAS REGISTRY/EC NUMBER(S)- 7732-18-5**

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**14. MEASUREMENT OF CONDUCTIVITY IN HIGH PURITY WATER**

**CAS SECTION- 161**

**CAS SUBSECTION- 003**

CAS 103-12 103-200612 CA 103:200612 NDN- 152-0343-1650-3

HUNT, ROBERT C.

ULTRAPURE WATER, 1985, VOL.2, ISS.4, PP.26-9

**DOCUMENT TYPE- JOURNAL**

**CODEN- ULWAE5**

**LOCATION OF WORK- SENSOR DEV., INC., SANTA ANA, CA 92704, USA**

**SUBFILE CODE- APP**

**LANGUAGE- ENGLISH**

Copyright 2000 by American Chemical Society

NO-ABSTRACT

**DESCRIPTOR(S)**- ULTRAPURE WATER PREPN COND MEASUREMENT; IMPURITY DETN  
**ULTRAPURE WATER COND**  
**CAS REGISTRY/EC NUMBER(S)**- 7732-18-5

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**15. PROCEDURE FOR THE MEASUREMENT OF THE CONDUCTIVITY OF HIGH-PURITY WATER**

**CAS SECTION**- 161

**CAS SUBSECTION**- 003

CAS 103-09 103-146831 CA 103:146831 NDN- 152-0337-7872-2

ROMMEL, K.

VGB KRAFTWERKSTECH., 1985, VOL.65, ISS.4, PP.417-21

**DOCUMENT TYPE**- JOURNAL

**CODEN**- VGBKB5

**LOCATION OF WORK**- WISS. TECH. WERKSTAETTEN, WEILHEIM, FED. REP. GER.

**SUBFILE CODE**- APP

**LANGUAGE**- GERMAN

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NO-ABSTRACT

**DESCRIPTOR(S)**- COND PURE WATER DIFFERENTIAL MEASUREMENT

**CAS REGISTRY/EC NUMBER(S)**- 7732-18-5

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Citations from CA SEARCH (75-79): CA5

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**16. ELECTROLYTIC CONDUCTIVITY MEASUREMENT OF HIGH PURITY WATER**

**CAS SECTION**- 061

**CAS SUBSECTION**- 002

CAS 089-12 089-203894 CA 089:203894 NDN- 154-0454-4787-9

WARMOTH, DENIS

KENT TECH. REV., 1978, VOL.22, PP.10-13

**DOCUMENT TYPE**- JOURNAL

**CODEN**- KTTRAH

**LOCATION OF WORK**- ELECTRON. INSTRUM. LTD., KENT, ENGL.

**SUBFILE CODE**- APP

**LANGUAGE- ENGLISH**

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NO-ABSTRACT

**DESCRIPTOR(S)- ELEC COND WATER ANALYSIS**

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Citations from ENGINEERING INDEX: EIX

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**17. Cell constant documented continuous conductivity measurements in ultrapure water measurements**

EIX 98-13 EIX98134047263 NDN- 017-0291-0753-6

Weiske, F.

Chemie-Technik (Heidelberg) v 26 n 11 Nov 1997. p 22-23  
1997

**DOCUMENT TYPE-** JA, Journal Article

ISSN- 0340-9961

**CODEN-** CMTKAT

**JOURNAL NAME-** Chemie-Technik (Heidelberg)

**LANGUAGE-** German

Incorrectly calibrated measuring systems and changes in the cell constant of a sensor have a pronounced falsifying effect on the results of conductivity measurements at the limits of intrinsic conductivity of water. This is a particular problem in the production of ultrapure water. Sensor calibration according to ASTM helps to overcome such difficulties. (Author abstract)

**DESCRIPTOR(S)-** Effects; Measurements; Sensors; Water

**IDENTIFIER(S)-** Cell constant; Continuous conductivity measurements; Ultrapure water measurements

**TREATMENT CODE-** TC-X (Experimental)

**SECTIONAL CLASSIFICATION CODE-** CAL732.2; CAL804

**SECTION HEADING-** Calibration

---

**18. Effect of temperature, temperature error, and impurities on compensated conductivity measurements**

EIX 97-29 EIX97293665695 NDN- 017-0274-6840-2

Bevilacqua, A.C.

Conference Proceedings - Annual Semiconductor Pure Water and Chemicals Conference v 1 1997. Balazs Analytical Laboratory, Sunnyvale, CA, USA. p 131-160

1997

**DOCUMENT TYPE-** CA, Conference Article**CODEN-** CPWCEB**AUTHOR AFFILIATION-** Thornton Associates, Inc, Waltham, MA, USA**CONFERENCE DATE-** 19970303-19970307**CONFERENCE TITLE -** Proceedings of the 1997 16th Annual Semiconductor Pure Water and Chemicals, SPWCC, Part 1 (of 2)**CONFERENCE LOCATION-** Santa Clara, CA, USA**CONFERENCE CODE NO.-** 46405**JOURNAL NAME -** Conference Proceedings - Annual Semiconductor Pure Water and Chemicals Conference**LANGUAGE-** English

The use of pure ( less than 1 mu S/cm, greater than 1 M Omega -cm) and **ultrapure** ( greater than 18 M Omega -cm) water has long been required for its cleansing ability and the need for defect-free semiconductors. In particular, hot **ultrapure** water has been shown to be cost effective, where the benefits of self-sanitization and improved rinsing ability overshadow the cost of heated water. Modern resistivity instrumentation provides a resistivity and temperature measurement in a single sensor, and the meter possesses microprocessor-controlled algorithms to calculate temperature-compensated resistivity/conductivity. Despite continual improvements in instrument and sensor performance, the reduced sensitivity of resistivity measurements at higher temperatures complicates the monitoring of hot UPW. We have re-measured the resistivity of **ultrapure** water, with emphasis on the 60-100 degree C range, and we have verified our measurements by re-calculating the resistivity of double prime theoretically double prime pure water. We have also examined the effects of temperature, resistivity, and impurity error and their impact on system performance for compensated measurements. For example, at 25 degree C, the resistivity of UPW decreases by 4.0% when 1.0 mu g/L (ppb) of NaCl impurity is present (8.5% when 1 ppb of HCl impurity is present). However, at 85 degree C, the resistivity of the same water decreases less than 1.0% (1.9% for HCl). (Author abstract) 12 Refs.

**DESCRIPTOR(S) -** Electric conductivity measurement; Impurities; Industrial water treatment; Semiconductor device manufacture; Water analysis; Water quality**IDENTIFIER(S)-** Ultra pure water**TREATMENT CODE-** TC-X (Experimental); TC-A (Applications)**SECTIONAL CLASSIFICATION CODE -** CAL701.1; CAL942.2; CAL714.2; CAL445.1.2; CAL445.2; CAL801**SECTION HEADING-** Electric conductivity of liquids**19. Test results for a heat-treated 4-cell 805-MHz superconducting cavity**

EIX 96-36 EIX96363241265 NDN- 017-0253-4386-9

Rusnak, Brian; Shapiro, Alan

Proceedings of the IEEE Particle Accelerator Conference v 3 1995. IEEE, Piscataway, NJ, USA, 95CB35843. p 1636-1638

1995

**DOCUMENT TYPE-** CA, Conference Article**CODEN-** PIACET

**AUTHOR AFFILIATION-** Los Alamos Natl Lab, Los Alamos, NM, USA

**CONFERENCE DATE-** 19950501-19950505

**CONFERENCE TITLE-** Proceedings of the 1995 16th Particle Accelerator Conference. Part 3 (of 5)

**CONFERENCE LOCATION-** Dallas, TX, USA

**CONFERENCE CODE NO.-** 44949

**JOURNAL NAME-** Proceedings of the IEEE Particle Accelerator Conference

**LANGUAGE-** English

Assessing superconducting technology for potential upgrades to existing proton accelerators as well as applications to future high-current machines necessitates developing expertise in the processing and handling of multicell cavities at useful frequencies. In order to address some of these technological issues, Los Alamos has purchased a 4-cell 805-MHz superconducting cavity from Siemens AG. The individual cavity cells were double-sided titanium heat-treated after equatorial welding, then the irises were welded to complete the cavity assembly. The resulting high RRR (550-730) in the cells enables stable operation at higher cavity field levels than are possible with lower RRR material. Additionally, the high thermal conductivity of the material is conductive to rf and high peak power processing. The cavity was also cleaned at Los Alamos with high-pressure water rinsing. Results from the initial cavity tests, utilizing various processing techniques, are presented. (Author abstract) 6 Refs.

**DESCRIPTOR(S)** - Electric currents; Electric welding; Electron emission; Heat treatment; Liquid chromatography; Particle accelerators; Pressure; Superconducting devices; Thermal conductivity

**IDENTIFIER(S)**- Equatorial welding; Field emission; High current machines; High power water rinsing; High purity liquid chromatography; Residual resistance ratio; Superconducting cavity

**TREATMENT CODE-** TC-A (Applications); TC-X (Experimental)

**SECTIONAL CLASSIFICATION CODE** - CAL714.1; CAL708.3; CAL537.1; CAL932.1.1; CAL701.1; CAL641.1

**SECTION HEADING-** Cavity resonators

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## 20. On-line boiler and condensate measurements : conductivity , pH, and dissolved oxygen

EIX 96-31 EIX96313207716 NDN- 017-0250-9888-7

Gray, David M.

Materials Performance v 35 n 5 May 1996. p 49-55  
1996

**DOCUMENT TYPE-** JA, Journal Article

**ISSN-** 0094-1492

**CODEN-** MTPFB1

**AUTHOR AFFILIATION-** Leeds and Northrup, North Wales, PA, USA

**JOURNAL NAME-** Materials Performance

**LANGUAGE-** English

The life of boilers and related components depends heavily on the quality of water treatment. Reliable measurements on high purity water are more difficult than on conventional water because the chemical properties are significantly different. Sample conditioning, signal stability, and temperature compensation are all handled differently when dealing with high purity water. A review of the basic measurements of conductivity, cation conductivity, pH, and dissolved oxygen, along with special precautions required for

successful **high purity** water measurements are presented. (Author abstract) 12 Refs.

**descriptor(s)**- pH; Boilers; Carbon dioxide; Electric conductivity measurement; Impurities; Oxygen; Sampling; Water quality; Water treatment

**Identifier(s)** - Dissolved oxygen; **High purity water**; Online boiler measurement; Sample conditioning; Signal stability

**Treatment Code**- TC-X (Experimental)

**Sectional Classification Code** - CAL444; CAL445.2; CAL942.2; CAL801.1; CAL804; CAL614

**Section Heading**- Water

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Citations from European Patent Applications: EPA

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**21. Instrument for potentiometric electrochemical measurements in earth grounded solutions.**

EPA 88-35 0280230 NDN- 050-0017-1344-9

**INVENTOR(S)**- Connery, James G. 215 Welsh Road Amber Lansdale Pennsylvania US

**INVENTOR(S)**- Shaffer, Earl W., Jr. 2102 Marshall Court Lansdale Pennsylvania US

**APPLICANT(S)**- GENERAL SIGNAL CORPORATION (209981) PO Box 10010 High Ridge Park Stamford Connecticut 06904 US **DESG. COUNTRIES**- ES; FR; GB; IT

**PATENT APPLICATION NUMBER**- 88102564

**DATE FILED**- 1988-02-22

**PUBLICATION NUMBER**- 00280230/EP A2

**PUBLICATION DATE**- 1988-08-31

**PATENT PRIORITY INFO**- US, 20056, 1987-02-27

**ATTORNEY, AGENT, OR FIRM**- Baillie, Iain Cameron et al, (27951), c/o Ladas & Parry Isartorplatz 5, D-8000 Munchen 2, DE

**INTERNATIONAL PATENT CLASS**- G01N02730

**PUBLICATION**- 1988-08-31, A2, Published application without search report

**FILING LANGUAGE**- English

**PROCEDURE LANGUAGE**- English

**LANGUAGE**- English

There is provided a system for measuring a selected ion in a solution so as to avoid noise pickup from AC parasitic currents and measurement offset from DC parasitic currents, such as are frequently found in pH measurements on low **conductivity** grounded solutions like **high purity water**. The system in one form has

an operational amplifier with an ion selective electrode connected to its inverting input, a counter electrode connected to its output, and circuit common connected to the non-inverting input, so that the potential of the ion selective electrode is continuously driven to circuit common. The reference electrode of the system is connected to a high impedance measuring circuit for measuring the voltage level of that electrode with reference to circuit common as a measure of the concen(syllable hyphen) tration of the selected ion in the solution.

**DESIGNATED COUNTRY(S)-** ES; FR; GB; IT

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Citations from European Patent Granted: EPB

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## **22. IMPROVED TECHNIQUE FOR THE MEASUREMENT OF HIGH PURITY WATER**

EPB 97-11 0429439 NDN- 069-0321-5025-0

**INVENTOR(S)-** KAISER, Donald. F. 9880 Tonawanda Creek Road, Clarence Center New York 14032 US

**PATENT ASSIGNEE(S) -** ROSEMOUNT ANALYTICAL INC. (1388950) 600 South Harbor Boulevard La Habra, California 90631 US **DESG. COUNTRIES- AT; BE; CH; DE; FR; GB; IT; LI; LU; NL; SE**

**PATENT NUMBER- 00429439/EP B1**

**PATENT APPLICATION NUMBER- 87906248**

**DATE FILED- 1987-08-28**

**PUBLICATION DATE- 1997-03-12**

**AVAILABILITY LIMITER- WIPO Document**

**PATENT PRIORITY INFO- US, 903388, 1986-09-03**

**ATTORNEY, AGENT, OR FIRM -** Cross, Rupert Edward Blount et al, (42891), BOULT WADE TENNANT 27 Furnival Street, London EC4A 1PQ, GB

**INTERNATIONAL PATENT CLASS- G01N02706; G01N03318**

**PCT APP. NO.- 8702180/US/PCT**

**PCT PUB. NO.- 88001740/WO**

**PCT PUB. DATE- 1988-03-10**

**PUBLICATION- 1991-06-05, A1, Published application with search report; 1997-03-12, B1, Publication of granted patent**

**FILING LANGUAGE- English**

**PROCEDURE LANGUAGE- English**

**LANGUAGE- English**

**EXEMPLARY CLAIMS-** A circuit for providing an output representative of a conductivity sensed by a cell (20, 52, 54) which produces an electrical cell signal which is affected by the conductivity and by a capacitance, comprising:  
excitation means (22, 142) for coupling to the cell to provide a periodic time-varying excitation to the cell;

sampling means (24, 26, 104, 157, 158) for coupling to the cell to sample the electrical cell signal during first and second different time intervals to produce respective first and second cell signals wherein the first and second time intervals each correspond to a different portion of a half-cycle of the time varying excitation, a first time interval and a second time interval having a combined duration of sampling less than a half-cycle of the time varying excitation; and

measurement means (60, 92, 94) coupled to the sampling means for measuring the first and second cell signals as sampled during the first and second time intervals and for providing the output substantially corrected for the effect of the capacitance as a function of the first and second cell signals.

The circuit of Claim 1 wherein the measurement means measure a magnitude of the first cell signal sampled during the first time interval and a magnitude of the second cell signal sampled during the second time interval.

The circuit of Claim 2 wherein the measurement means computes the correction as a function of the magnitudes of the first and second cell signals sampled during the first and second time intervals.

The circuit of Claim 3 wherein the sampling means comprises at least one switch (152, 158) controlled to conduct during the first time interval.

The circuit of Claim 1 wherein the excitation is substantially a square wave waveform.

The circuit of Claim 5 wherein the first time interval is a center-sampling interval within a half-cycle of the square wave waveform.

The circuit of Claim 5 wherein the second time interval is an end-sampling interval within a half-cycle of the square wave waveform

The circuit of Claim 7 wherein the measurement means comprises an integrating ramp analog-to-digital converter (92, 94).

The circuit of Claim 8 further comprising:

temperature sensing means (56, 58) coupled to the cell for sensing a temperature of the cell and providing a signal representative of temperature to the measurement means; and  
wherein the measurement means corrects the output for an effect of temperature.

A method of measuring conductivity of a fluid with a conductivity cell (20, 52, 54), the method comprising:

applying an AC drive signal to the cell;

sampling an output of the cell during a first time interval to produce a first cell signal;

sampling the output of the cell during a second, different, time interval to produce a second cell signal, the first and second time intervals corresponding to different portions of a half-cycle of the AC drive signal and having a combined duration less than a half-cycle of the AC drive signal;

deriving a correction for capacitance induced error based upon the first and second signals; and

producing an output representative of measured conductivity based upon the first cell signal and the correction.

The method of Claim 10 wherein the first time interval occurs in a center portion of a half-cycle of the AC drive signal.

The method of Claim 11 wherein the second time interval occurs in a portion of the half-cycle different at least in part from the center portion.

The method of Claim 10 wherein the AC drive signal has a square wave waveform.

**DESIGNATED COUNTRY(S)-** AT; BE; CH; DE; FR; GB; IT; LI; LU; NL; SE

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Citations from INSPEC: INS

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**23. A technique for in situ measurement of the conductivity of water in 'triple point of water' cells**

INS 99-31 6318061 A1999-18-0750-002 (PHA); NDN- 174-0631-8060-9

Ballico, M.

**JOURNAL NAME-** Measurement Science & Technology

**ABBREVIATED JOURNAL TITLE-** Meas. Sci. Technol. (UK)

**VOL.** 10

**NO.** 7

July 1999

**PP.** L33-6

5 reference(s)

**DOCUMENT TYPE-** Journal paper

**ISSN-** 0957-0233

**CODEN-** MSTCEP

**CORPORATE AUTHOR-** Nat. Meas. Lab., CSIRO, Lindfield, NSW, Australia

**COPYRIGHT OF BIBLIOGRAPHIC-** Copyright 1999, IEE

**COPYRIGHT CLEARANCE CENTER CODE-** 0957-0233/99/070033+04\$19.50

**PUBLISHER-** IOP Publishing

**PUBLICATION COUNTRY-** UK

**LANGUAGE-** English (DEF)

Sealed glass ampoules made for the realization of the triple point of water as a thermometric reference point, 0.01 degrees C, must be filled with water of the highest possible purity. This paper discusses a simple electrical technique for measurement of the conductivity of high-purity water within such cells, and presents calculations of the calibration factor in this geometry. The technique is then applied to a large set of cells, some dating back up to 40 years, and the results are compared with measurements of the cells' triple point temperature. The measurements indicate that the effective ionic conductivity of the impurities in the cells is as low as 2 mS m<sup>sup</sup> 2/ mol<sup>sup</sup> -1.

**DESCRIPTOR(S)** - calibration; capacitance measurement; critical points; electric admittance measurement; electrical conductivity measurement; equivalent circuits; impurities; ionic conductivity; measurement standards; water

**IDENTIFIER(S)** - calibration factor; effective ionic conductivity; electrical conductivity; electrical susceptance; equivalent circuit; equivalent series capacitance; high-purity water; impurities presence; in situ measurement; lumped element circuit model; sealed glass ampoules; simple electrical technique; thermometric reference point; triple point of water cells; H<sub>sub</sub> 2/O; 2D model

**CHEMICAL INDEXING-** H<sub>2</sub>O/bin H<sub>2</sub>/bin H/bin O/bin

**TREATMENT CODE-** TC-T; TC-X

**SECTIONAL CLASSIFICATION CODE-** A0750; A0620H; A0630L; B7310J; B7130

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Citations from Patent Abstracts of Japan: PAJ

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**24 . MEASURING | METHOD FOR ELECTROLYTE ELUTABILITY OF SAMPLE, AND OPTICL DISK**

PAJ 08-01-99 11223613 JP NDN- 043-0149-0465-0

**INVENTOR(S)- KAWASAKI, MINORU**

**PATENT APPLICATION NUMBER- 10041385**

**DATE FILED- 1998-02-06**

**PUBLICATION NUMBER- 11223613 JP**

**DOCUMENT TYPE- A**

**PUBLICATION DATE- 1999-08-17**

**INTERNATIONAL PATENT CLASS- G01N02706; G11B00726**

**APPLICANT(S)- VICTOR CO OF JAPAN LTD**

**PUBLICATION COUNTRY- Japan**

**PROBLEM TO BE SOLVED:** To measure electrolyte elutability of a sample upto a microquantity with excellent precision.

**SOLUTION:** This measuring method has a process where a prescribed size of a sample is immersed into **ultrapure water** in a container to measure electric conductivity of the **ultrapure water** for providing electric conductivity before heating, a process where the **ultrapure water** in the container is put at an ordinary temperature after the **ultrapure water** in the container is heated upto a prescribed temerature in a sealed condition and maintained for a prescribed time or more to measure electric conductivity of the **ultrapure water** for provding electric conductivity after heating, a process where **ultrapure water** of same amount as the **ultrapure water** is filled into a blank container of same shape and composition as the container to measure electric conductivity of the **ultrapure water** for providing blank electric conductivity before heating, a process where the **ultrapure water** in the blank container is put at the ordinary temperature after the **ultrapure water** in the container is heated upto the prescribed temperature in a sealed condition of the blank container and maintained for the prescribed time or more to measure electric conductivity of the **ultrapure water** for providing blank electric conductivity after heating, and a process for finding electrolyte elutability per unit mass of the sample based on each electric conductivity. The electrolyte elutability of the sample is measured upto a microquantity with excellent precision by this method.

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**NO-DESCRIPTORS**

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**25 . TOTAL CARBONIC ACID CONCENTRATION MEASURING APPARATUS,  
ULTRAPURE-WATER PREPARATION APPARATUS PROVIDED WITH THE SAME AND  
PREPARATION OF ULTRAPURE WATER**

PAJ 04-01-99 11101761 JP NDN- 043-0136-8658-3

**INVENTOR(S)- NOMURA, MAKOTO; FURUKAWA, MASAHIRO**

**PATENT APPLICATION NUMBER- 09263692**

**DATE FILED- 1997-09-29**

**PUBLICATION NUMBER- 11101761 JP**

**DOCUMENT TYPE- A**

**PUBLICATION DATE- 1999-04-13**

**INTERNATIONAL PATENT CLASS- G01N02710; C02F00142**

**APPLICANT(S)- KURITA WATER IND LTD**

**PUBLICATION COUNTRY- Japan**

**PROBLEM TO BE SOLVED:** To obtain a total carbonic acid concentration measuring apparatus by which a carbonic acid concentration in pure water or ultrapure water can be detected simply and with high accuracy, by a method wherein a total carbonic acid concentration is computed on the basis of the measured value of the conductivity or the resistivity of the pure water.

**SOLUTION:** A resistivity sensor 6A is installed on the entrance side of a mixed-bed ion exchange apparatus 4, and the resistivity of water flowing into the exchange apparatus 4 is measured by a resistivity meter 7A. On the other hand, a resistivity sensor 6B is installed on the exit side of the exchange apparatus 4, and the resistivity of water which flows out is measured by a resistivity meter 7B. Its measurement can be performed instantaneously. Consequently, even when a change in the resistivity is large, the measurement can be performed continuously, stably and with high accuracy. Measured values including a water passage amount by a flowmeter 8 are inputted to a computing device 9. By using a specific calculating expression, the total carbonic acid concentration of the water which flows into and total carbonic acid concentration of the water which flows out are computed. In addition, also the carbonic acid load amount of the exchange apparatus 4 and the carbonic acid load factor (the utilization factor) of an ion-exchange resin can be found. As a result, it is possible to estimate the time in which the ion-exchange resin reaches a breakthrough, i.e., the replacement time or the regeneration time of the ion-exchange apparatus 4.

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**NO-DESCRIPTORS**

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**26. UNDERWATER TOC MONITOR**

PAJ 11-01-98 10307114 JP NDN- 043-0123-2475-6

**INVENTOR(S)- ITO, MASAYOSHI**

**PATENT APPLICATION NUMBER- 09132877**

**DATE FILED- 1997-05-07**

**PUBLICATION NUMBER- 10307114 JP**

**DOCUMENT TYPE- A**

**PUBLICATION DATE- 1998-11-17**

**INTERNATIONAL PATENT CLASS- G01N02706; G01N03318**

**APPLICANT(S)- KURITA WATER IND LTD**

**PUBLICATION COUNTRY- Japan**

**PROBLEM TO BE SOLVED:** To continuously measure a TOC concentration rapidly and accurately at a field condensing an electrolyte that is obtained by decomposing TOC (organic body carbon) constituent in an **ultra-pure water** by applying ultraviolet rays using a continuously reproduction type ion exchange device and measuring the electrical **conductance** of condensed **water**.

**SOLUTION:** Sample **water** is sampled from an **ultra-pure** pipe and is sent to an ultraviolet ray application device 1. Ultraviolet rays are applied to sample **water** in a **water** passage path 5 by an ultraviolet ray lamp 4, and a TOC constituent in the sample **water** is decomposed into carbon dioxide and ultraviolet ray application treatment **water** where bicarbonate ion exists in **water**. Then, the ultraviolet ray application treatment **water** is sent to a continuous reproduction type ion exchange device 2. When a potential difference is given between an anode 7 and a cathode 6, a cation is rejected by an anion exchange film 8, an anion is rejected by a cation exchange film 9, and a bicarbonate ion in **water** is moved from an electrode room 12 to a condensation room 10 and is condensed. Then, the condensation **water** is sent to an electrical **conductance** meter 3, thus easily obtaining the concentration of the TOC constituent in **ultra-pure water** from the value of the electrical conductance.

**COPYRIGHT:** (C)1998,JPO

**NO-DESCRIPTORS**

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## **27. WATER-QUALITY MONITOR AND WATER-QUALITY MONITORING METHOD**

PAJ 01-01-96 08166378 JP NDN- 043-0046-7749-0

**INVENTOR(S)- ITO, MASAYOSHI; MIZUNIWA, TETSUO**

**PATENT APPLICATION NUMBER- 06332499**

**DATE FILED- 1994-12-13**

**PUBLICACION NUMBER- 08166378 JP**

**DOCUMENT TYPE- A**

**PUBLICACION DATE- 1996-06-25**

**INTERNATIONAL PATENT CLASS - G01N03064; G01N03002; G01N03008; G01N03088; G01N03318**

**APPLICANT(S)- KURITA WATER IND LTD**

**PUBLICATION COUNTRY- Japan**

**PURPOSE:** To make it possible to measure the total ion concentration of **ultra-pure water** or the like having the low impurity concentration accurately and quickly by enriching and capturing the ionic impurities of the super-pure **water** with ion exchange resin, then performing elution with acid solution and alkali solution, and measuring the electric conductivity of the impurities.

**CONSTITUTION:** The sample **water**, wherein sodium chloride is added into **ultra-pure water**, is sent into a cation enriching column 5 filled with strong-acid cation exchange resin and an anion enriching column 11 filled with strong-base anion exchange resin by sample-water feeding pumps 8 and 14 through switching valves 6, 7, 12 and 13. The cations and the anions are enriched and captured. Then, the valves 6 and 7 are switched and acid solution 9 is supplied into the column 5, and the valves 12 and 13 are

switched and the alkali solution 15 is supplied into the column 5. Thus, the cations and the anions are eluted. The elute liquids are mixed in a confluence forming part 17 and guided into an electric conductivity meter 18, and the electric conductivity is measured. The total ion concentration in the sample water is obtained based on the difference in electric conductivities between the acid solution and the alkali solution used in elution.

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NO-DESCRIPTORS

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## 28. WATER-QUALITY MONITOR AND WATER-QUALITY MONITORING METHOD

PAJ 01-01-96 08166377 JP NDN- 043-0046-//48-9

INVENTOR(S)- ITO, MASAYOSHI; MIZUNIWA, TETSUO

PATENT APPLICATION NUMBER- 06332498

DATE FILED- 1994-12-13

PUBLICATION NUMBER- 08166377 JP

DOCUMENT TYPE- A

PUBLICATION DATE- 1996-06-25

INTERNATIONAL PATENT CLASS - G01N03064; G01N03002; G01N03008; G01N03088; G01N03318

APPLICANT(S)- KURITA WATER IND LTD

PUBLICATION COUNTRY- Japan

PURPOSE: To make it possible to measure the concentration of total ions of ultra pure water or the like having the very low impurity concentration by capturing ionic impurities by ion exchange resin, then performing elution with high-temperature water, and measuring the electric conductivity.

CONSTITUTION: Sample water, wherein sodium chloride is added into ultra pure water, is guided into an ion enriching column 4, wherein strong-acid cation exchange resin and strong-base anion exchange resin are filled at the volume ratio of 4:6-6:4 through a switching valve 3 by a sample-water feeding pump 2. Thus, sodium ions and chloride ions are captured. Then, the switching valves 3 and 5 are switched, the high-temperature water, whose temperature is set 8 at 60-100(degree sign)C, is introduced into the column through a high-temperature feeding pump 9 and the valve 5. The sodium ions and the chloride ions are eluted, and the elute liquid is sent into an electric-conductivity meter 10 through the valve 3. Then, the ion concentration is obtained. Thus, the total ion concentration of the ultra pure water or the like having the very low resistivity can be sensitively measured with high accuracy with the compact device, whose operation is simple.

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NO-DESCRIPTORS

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## 29. ORGANIC CARBON MEASURING DEVICE, AND ULTRAPURE WATER PRODUCING DEVICE WITH THE DEVICE BUILT-IN

PAJ 01-01-95 07260725 JP NDN- 043-0023-9545-6

**INVENTOR(S)-** TANABE, MADOKA

**PATENT APPLICATION NUMBER-** 06049659

**DATE FILED-** 1994-03-22

**PUBLICATION NUMBER-** 07260725 JP

**DOCUMENT TYPE-** A

**PUBLICATION DATE-** 1995-10-13

**INTERNATIONAL PATENT CLASS -** G01N02706; C02F00132; C02F00142; C02F00900; C02F00900; C02F00900; G01N03318

**APPLICANT(S)-** JAPAN ORGANO CO LTD

**PUBLICATION COUNTRY-** Japan

**PURPOSE:** To measure an organic carbon quantity with a miniature and inexpensive device without needing any preparation and calibration of a reaction reagent in a short time by performing ultraviolet oxidation treatment of deionized water to obtain oxidized water, and measuring the conductivity of the deionized water and the oxidized water.

**CONSTITUTION:** A deionized treatment part 1 is composed of an ion-exchange device or the like using ion-exchanging resin or the like. Conductivity of deionized water obtained in the deionized treatment part 1 is measured in a conductivity measuring part 3, and the output is transmitted to a comparison operation part 4. Thereafter, the deionized water is supplied to an ultraviolet oxidation treatment part 5 and ultraviolet analysis of organism is performed while the deionized water passes through the oxidizing treatment part 5. The conductivity of oxidized water is measured in another conductivity measuring part 6 and its output is transmitted to the comparison operation part 4. In the operation part 4, their output signals from the conductivity measuring parts 3, 6 are compared with each other, and a signal corresponding to the difference is taken out from an output line 7 in response to organism carbon concentration.

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**NO-DESCRIPTORS .**

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### **30. Instrument for potentiometric electrochemical measurements**

PAT 00-00-89 04851104 NDN- 167-0149-1094-3

**INVENTOR(S)-** Connery, James G.; Shaffer, Jr., Earl W.

**PATENT NUMBER-** 04851104

**PATENT APPLICATION NUMBER-** 220922

**DATE FILED-** 1988-07-18

**PATENT DATE-** 1989-07-25

**NUMBER OF CLAIMS- 9**

**EXEMPLARY CLAIMS- 1**

**FIGURES- 3**

**ART/GROUP UNIT- 112**

**PATENT CLASS-** Invention (utility) patent

**PATENT ASSIGNEE(S)-** General Signal Corporation

**ASSIGNEE CITY-** Stamford

**ASSIGNEE STATE- CT**

**ATTORNEY, AGENT, OR FIRM-** Huberfeld, Harold; Miller, Jr., William G.

**U.S. PATENT CLASS-** 2044060000

**U.S. CLASSIFICATION REFS.-** X204412000, X204416000

**INTERNATIONAL PATENT CLASS-** G01N02726

**PATENT REFERENCE(S)-** 3862895; 4189367; 4385274; 4426621; 4498039; 4505799; 4560840

**PATENT REFERENCED BY-** 05407854; 05414284; 05419826; 05833824

There is provided a system for measuring a selected ion in a solution so as to avoid noise pickup from AC parasitic currents and measurement offset from DC parasitic currents, such as are frequently found in pH measurements on low conductivity grounded solutions like high purity water. The system in one form has an operational amplifier with an ion selective electrode connected to its inverting input, a counter electrode connected to its output, and circuit common connected to the non-inverting input, so that the potential of the ion selective electrode is continuously driven to circuit common. The reference electrode of the system is connected to a high impedance measuring circuit for measuring the voltage level of that electrode with reference to circuit common as a measure of the concentration of the selected ion in the solution.

**EXEMPLARY CLAIMS -** Claim- 1. An improved apparatus for measuring the concentration of a selected ion in an electrolyte solution, comprising: ; an ion selective probe system having ; an ion selective device responsive to the concentration of the selected ion in the solution, ; a reference electrode, and ; a counter electrode; ; a potential measuring device having a high impedance input connected to said reference electrode so as to measure the potential of the reference electrode with respect to circuit common; and ; a control amplifier connected to said probe system so that its output is provided through said counter electrode in magnitude and sense to maintain the electrical characteristic of said ion selective device relative to the circuit common potential such that the potential of said reference electrode, as measured by said measuring device, provides an indication of the concentration of said selected ion in said solution.

NO-DESCRIPTORS .

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**31. Rugged dissolved carbon dioxide monitor for high purity water**

PAT 00-00-89 04801551 NDN- 167-0144-1622-5

**INVENTOR(S)-** Byers, William A.; Carlson, Gerald L.; Bellows, James C.

**PATENT NUMBER-** 04801551

**PATENT APPLICATION NUMBER-** 915605

**DATE FILED-** 1986-10-06

**PATENT DATE-** 1989-01-31

**NUMBER OF CLAIMS- 10**

**EXEMPLARY CLAIMS- 1**

**FIGURES- 9**

**ART/GROUP UNIT- 181**

**PATENT CLASS-** Invention (utility) patent

**PATENT ASSIGNEE(S)-** Westinghouse Electric Corp.

**ASSIGNEE CITY-** Pittsburgh

**ASSIGNEE STATE- PA**

**U.S. PATENT CLASS-** 4361330000

**U.S. CLASSIFICATION REFS.-** X436068000; X436150000

**INTERNATIONAL PATENT CLASS-** G01N03318; G01N03348

**PATENT REFERENCE(S) -** 2832673; 2901327; 2950176; 3042495; 3158444; 3399037; 3531252; 3904365; 4003705; 4251219; 4251220; 4272246; 4472354

**PATENT REFERENCED BY -** 05013522; 05068090; 05081041; 05081042; 05175016; 05252491; 05284775; 05462052; 05521510

A continuous on-line monitor of carbon dioxide dissolved in **high purity water** includes a cation **conductivity** cell and associated bridge for measuring first and second cation conductivities at first and second temperature and a heater for heating the sample from the first to the second temperature. A microcomputer calculates first and second concentrations of a fully dissociated acid alone and carbon dioxide alone, respectively, which will produce the first measured cation **conductivity** at the first temperature and then determines the actual carbon dioxide concentration from the first and second concentrations and the second measured cation **conductivity**.

**EXEMPLARY CLAIMS-** Claim- 1. A method of determining dissolved carbon dioxide concentration in a sample, comprising the steps of: ; (a) measuring a first cation **conductivity** in the sample at a first temperature; ; (b) measuring a second cation **conductivity** in the sample at a second temperature different from the first temperature; and ; (c) determining an actual concentration of carbon dioxide in the sample in dependence upon the first and second measured cation conductivities.

**NO-DESCRIPTORS**

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### **32. Apparatus for measuring content of organic carbon**

PAT 00-00-88 04769217 NDN- 167-0140-2199-1

**INVENTOR(S)-** Sienkiewicz, Peter M.; Mavrides, Roger

**PATENT NUMBER-** 04769217

**PATENT APPLICATION NUMBER-** 728488

**DATE FILED-** 1985-04-29

**PATENT DATE-** 1988-09-06

**NUMBER OF CLAIMS- 7**

**EXEMPLARY CLAIMS- 1**

**FIGURES- 6**

**ART/GROUP UNIT- 134**

**PRIMARY INDUSTRY-** 93-01-BK

**PATENT CLASS-** Invention (utility) patent

**PATENT ASSIGNEE(S)**- Servomex Company

**ASSIGNEE CITY**- Norwood

**ASSIGNEE STATE**- MA

**ATTORNEY, AGENT, OR FIRM**- Marjama & Pincelli

**U.S. PATENT CLASS**- 4220800000

**U.S. CLASSIFICATION REFS.** - X07300100H; X07330400R; X137392000; X137428000; X141198000; X141331000; X222064000; X222425000; X422082000; X422100000; X422106000; X422110000; X436146000; X436180000

**INTERNATIONAL PATENT CLASS**- G01N00110; G01N02700

**PATENT REFERENCE(S)** - 2385161; 3004554; 3119266; 3477460; 3888382; 3929411; 3958941; 4277438; 4315579; 4362033; 4420094; 4483463; 4530370; 4554255

**PATENT REFERENCED BY** - 05275957; 05312756; 05333498, 05480806; 05531965, 05567388; 05994146

**FOREIGN DOCUMENT REFERENCE(S)**- 83/00207

**FOREIGN COUNTRY CODE**- WOX

**PATENT STATUS INFO**- 11/10/92, Expiration Due to Failure to Pay Maintenance Fees, (EXP)

An apparatus for automatically selectively introducing successive samples of a liquid from at least one pressurized line into a receiving funnel having an outlet port and at least one inlet port. The receiving funnel has main receiving chamber for receiving liquid samples and a sensing device is also provided in the receiving funnel for sensing the level of liquid present in the receiving funnel for controlling flow in and out of the funnel.

**EXEMPLARY CLAIMS**- Claim- 1. An apparatus for measuring the amount of dissolved organic carbon introduced into a quantity of ~~ultra pure~~ carrier water, said apparatus comprising: ; a first housing; ; a ~~water~~ pump; ; a first ~~water~~ loop containing a quantity of ~~ultra~~ pure carrier ~~water~~, including and interconnecting said pump and said first housing for continuously circulating the quantity of ~~ultra~~ pure carrier ~~water~~; ; means for automatically introducing a liquid sample having dissolved organic carbon liquid into said first ~~water~~ loop; ; an ultraviolet lamp in ultraviolet communication with an interior of said first housing for irradiating dissolved organic carbon present in said first housing; ; a second housing; ; a second loop interconnecting said first housing and said second housing for transferring a portion of carbon dioxide produced in said first housing into said second housing and for supplying oxygen to said first housing; ; measurement means for measuring an amount of carbon dioxide in said second housing, the amount of carbon dioxide being representative of an amount of organic carbon introduced into the apparatus; ; said means for automatically introducing samples having dissolved organic carbon into said first ~~water~~ loop comprising: ; a receiving funnel having an outlet port, at least one inlet port connected to a pressurized line, an exhaust port for allowing air to enter or exit said funnel, a main receiving chamber for receiving said at least one inlet port and means defining a measuring chamber connected to the main receiving chamber by first and second passageways, said second passageway being positioned vertically above said first passageway to allow air to leave the measuring chamber thereby minimizing turbulence from said main chamber into said measuring chamber, said measuring chamber having a bottom end and a top outer end; ; means for controlling flow of a liquid to said funnel through said at least one inlet port; ; means for selectively maintaining liquid samples in said receiving funnel and emptying liquid samples from said funnel through said outlet port; ; said means for maintaining liquid samples in said receiving funnel and for emptying said receiving funnel comprising a first valve means in direct communication with said outlet port of said receiving funnel; said first valve means being in communication with an organic carbon measuring portion of said apparatus and with a second valve means which is in direct communication with a divert pump which empties to a drain; ; filter means connected to said exhaust port for minimizing introduction of impurities resulting from air entering or leaving said funnel in response to a level of liquid sample in said funnel; ; means for sensing a level of said liquid sample being maintained in said measuring chamber comprising a first electrode, a second electrode spaced from said first electrode, said first and

second electrodes being electrically connected to an amplifier for sensing conductivity of a medium between said first and second electrodes such that when a predetermined change in conductivity between said first and second electrodes is reached, said amplifier produces a response signal for stopping flow of liquid sample into said funnel, said first electrode comprising a cylindrical tube having an inner end directed to said bottom end of said measuring chamber and an outer end directed to the top end of said measuring chamber, said second electrode comprising a wire having an inner end which extends through said tube beyond said inner end of said tube, an insulating material disposed between said tube and said wire, said insulating material extending beyond the inner end of said tube but short of the inner end of said wire.

**NO-DESCRIPTORS****33. Instrument for measurement of the organic carbon content of water**

PAT 00-00-87 04666860 NDN- 167-0129-3477-4

**INVENTOR(S)**- Blades, Frederick K.; Godec, Richard D.**PATENT NUMBER**- 04666860**PATENT APPLICATION NUMBER**- 635551**DATE FILED**- 1984-08-02**PATENT DATE**- 1987-05-19**NUMBER OF CLAIMS**- 28**EXEMPLARY CLAIMS**- 1,20**FIGURES**- 19**ART/GROUP UNIT**- 134**PATENT CLASS**- Invention (utility) patent**PATENT ASSIGNEE(S)**- Anatel Instrument Corporation**ASSIGNEE CITY**- Boulder**ASSIGNEE STATE**- CO**ATTORNEY, AGENT, OR FIRM**- Saidman, Sterne, Kessler & Goldstein**U.S. PATENT CLASS**- 4361460000**U.S. CLASSIFICATION REFS.**- X422078000; X436905000**INTERNATIONAL PATENT CLASS**- G01N02702**DISCLAIMER**- 20031202**PATENT REFERENCE(S)** - 3287088; 3535087; 3738812; 3854877; 3958941; 4140018; 4227151; 4293522; 4357668; 4418566**PATENT REFERENCED BY** - 04804631; 04837374; 05132094; 05272091; 05275957; 05413763; 05443991; 05480806; 05531965; 05677190; 05798271; 05820823; 05902751**FOREIGN DOCUMENT REFERENCE(S)**- 2029015**FOREIGN COUNTRY CODE**- GBX

Apparatus and methods for measurement of total organic carbon content of water, particularly of low relative organic content, are described which feature a single sample cell for exposure of a static sample to ultraviolet radiation comprising electrodes for measuring the conductivity of the water. The conductivity is monitored as a function of time and the second time derivative of the conductivity signal is monitored to indicate when the oxidation reaction has been completed. Compensation for the contribution to

conductivity of the water sample made by the instrument is achieved by subtracting a quantity proportional to the first time derivative of the conductivity at a time when the second time derivative reaches zero, indicating that the oxidation reaction is complete, from the change in the total conductivity measurement, the remainder being equal to the contribution to conductivity made by oxidation of the organic content of the water.

**EXEMPLARY CLAIMS-** Claim- 1. Apparatus for the measurement of the total organic carbon content of a sample of ultrapure water, comprising: ; a sample cell having a window, ; a source of ultraviolet radiation of a frequency which causes oxidation of organic carbon compounds disposed in juxtaposition to said window, the material of said window being substantially transparent to said radiation, ; a pair of electrodes disposed in said sample cell, ; means for monitoring the conductivity between said electrodes as a function of time during which a sample is exposed to ultraviolet radiation from said source, ; means for determining when said conductivity or the time-rate of change of said conductivity has reached a stable value indicating that said oxidation has been substantially completed, comprising means for monitoring the first and second time derivatives of the conductivity between said electrodes and means for determining when the second derivative of said conductivity has reached to within a predetermined value of zero; and ; means for correcting the conductivity measured to an absolute value, comprising means for measuring the initial conductivity of a given water sample prior to oxidation, means for multiplying the first time derivative of the conductivity at time T when the second time derivative has reached to within a predetermined value of zero by said time T and subtracting the resulting quantity and the initial conductivity from the total conductivity measured between said electrodes at said time T, to provide a compensated output signal representative of the change in conductivity of the water sample due to oxidation of organic carbon compounds therein. ; Claim- 20. A method of measuring the total organic content of a sample of water, comprising the steps of: ; admitting a sample of water to a sample cell comprising a pair of electrodes and a window, ; measuring the conductivity of said water sample, ; exposing said sample to ultraviolet light through said window, ; monitoring the initial temperature-corrected conductivity of said water sample during its exposure to ultraviolet light, monitoring the first and second time derivatives thereof, and determining when the organic content of the sample has been fully oxidized responsive to determination that the second time derivative of the conductivity is within a predetermined value of zero; and ; outputting a signal indicative of the total organic carbon content of said sample in accordance with the change in conductivity during said oxidation.

NO-DESCRIPTORS

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Citations from PATENT ABSTRACTS OF JAPAN: PJ1

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**34. METHOD AND SYSTEM FOR DETECTING SALINITY**

PAJ 07-01-94 06194350 JP NDN- 190-0168-4226-2

**INVENTOR(S)- MURAYAMA, TAKESHI; OHARA, HISAKI**

**PATENT APPLICATION NUMBER-** 04342364

**DATE FILED-** 1992-12-22

**PUBLICATION NUMBER-** 06194350 JP

**DOCUMENT TYPE-** A

**PUBLICATION DATE-** 1994-07-15

**INTERNATIONAL PATENT CLASS -** G01N03002; G01M00304; G01N02706; G01N03004; G01N03088

**APPLICANT(S)-** YOKOGAWA ELECTRIC CORP

**PUBLICATION COUNTRY-** Japan

**PURPOSE:** To detect leakage of sea water quickly, positively, and automatically by measuring the acid conductivity while switching an ultrapure water, a standard liquid, and a sample liquid, and measuring the ion concentration of chloride when the acid conductivity of the sample liquid exceeds a set level.

**CONSTITUTION:** A conductivity detector 18 measures the conductivity of ultrapure water 2, at first. Since the ultrapure water 2 initially contains neither cation seed nor anion seed, a signal from the detector 18 passes through a membrane from the outside to the inside of a cation exchange tube thus exhibiting the conductivity of a base line caused by the migration of sulfuric acid in a removed liquid according to the concentration gradient. A standard liquid 3 has a specific acid conductivity and employed for determining a calibration curve basing on the increase of acid conductivity from the base line. When the conductivity of the sample liquid 1 exceeds a preset level, an ion chromatography measures chloride ions in the sample liquid 1 thus deciding whether leakage of sea water caused increase of conductivity of the sample liquid 1.

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NO-DESCRIPTORS

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Citations from PATENT ABSTRACTS OF JAPAN: PJ2

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**35. CONDUCTIVITY METER FOR ULTRAPURE WATER**

PAJ 00-52-76 57082776 JP NDN- 075-0234-8557-2

**INVENTOR(S)-** HOSONO, TOKUJI

**PATENT APPLICATION NUMBER-** 55158870

**DATE FILED-** 1980-11-13

**PUBLICATION NUMBER-** 57082776 JP

**DOCUMENT TYPE-** A

**PUBLICATION DATE-** 1982-05-24

**INTERNATIONAL PATENT CLASS-** G01R02722; G01N02706

**APPLICANT(S)-** FUJI SEIMITSU DENKI KK

**PUBLICATION COUNTRY- Japan**

**PURPOSE:** To improve the accuracy of measurement by determining the ratio of the compensation rate of an amplifier which is compensated of temps. at a constant rate, and the gains of a comparing amplifier and a divider and the input of an addition amplifier and approximating these to the temp. characteristics of pure water.

**CONSTITUTION:** Constant AC voltage 2 is applied to a cell 11 for measuring conductivity provided with a temp. sensing element 12, and the electric current flowing through the cell 11 is subjected to temp. compensation at a constant rate by the element 12. The 1st output is obtained by an amplifier 3 and a linear detecting circuit 4. The 2nd output is obtained by circuits 3' and 4' performing amplification and detection at the same amplification factor as that at the reference temp. of the circuit 3 without performing temp. compensation. The 1st and nd outputs are comparatively amplified 6, the output whereof is divided 7 by using the output of the circuit 4. The output thereof is added to the output of the circuit 4. As a result, the rate of the temp. compensation is larger with the smaller conductivity of the pure water to be measured and as the conductivity increases, the rate of the temp. compensation decreases.

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**NO-DESCRIPTORS**

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**Citations from PATENT ABSTRACTS OF JAPAN: PJ3**

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**36. CONDUCTIVITY METER FOR ULTRAPURE WATER**

PAJ 00-52-76 57082776 JP NDN- 198-0234-8557-0

**INVENTOR(S)-** HOSONO, TOKUJI

**PATENT APPLICATION NUMBER-** 55158870

**DATE FILED-** 1980-11-13

**PUBLICACION NUMBER-** 57082776 JP

**DOCUMENT TYPE-** A

**PUBLICACION DATE-** 1982-05-24

**INTERNATIONAL PATENT CLASS-** G01R02722; G01N02706

**APPLICANT(S)-** FUJI SEIMITSU DENKI KK

**PUBLICATION COUNTRY-** Japan

**PURPOSE:** To improve the accuracy of measurement by determining the ratio of the compensation rate of an amplifier which is compensated of temps. at a constant rate, and the gains of a comparing amplifier and a divider and the input of an addition amplifier and approximating these to the temp. characteristics of pure water.

**CONSTITUTION:** Constant AC voltage 2 is applied to a cell 11 for measuring conductivity provided with a temp. sensing element 12, and the electric current flowing through the cell 11 is subjected to temp. compensation at a constant rate by the element 12. The 1st output is obtained by an amplifier 3 and a linear detecting circuit 4. The 2nd output is obtained by circuits 3' and 4' performing amplification and detection at the same amplification factor as that at the reference temp. of the circuit 3 without performing temp. compensation. The 1st and nd outputs are comparatively amplified 6, the output whereof is divided 7 by using the output of the circuit 4. The output thereof is added to the output of the circuit 4. As a

result, the rate of the temp. compensation is larger with the smaller conductivity of the pure water to be measured and as the conductivity increases, the rate of the temp. compensation decreases.

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NO-DESCRIPTORS

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3. NDN 011-0000-0637-2: Abel transformation. Applications to fine structure using side-scatter on appropriate frequencies

*Citations from Chemical Engineering Abstracts (CEA): CEA*

4. NDN 141-0035-8554-2: PPM Ltd at IWEX apostrophe 97.

*Citations from Dissertation Abstracts: DIS*

5. NDN 135-0108-5133-8: CHARGE-SIGN DEPENDENT SOLAR MODULATION OF 1-10 GEV COSMIC RAYS

*Citations from DTIC: DOD*

6. DOD AD-A025-116: Development of an On-Line Organic Analyzer for the MUST Water

Processing Element.

7. DOD AD-664-385: SELF TEST AUTOMATIC SELF CALIBRATE AND INTEGRITY MONITOR AS APPLIED TO AVIONIC EQUIPMENT.

*Citations from Energy Science and Technology (DOE): EDB*

8. NDN 108-0672-4291-5: Continuous Emission Monitor for Toxic Metals in the Off-Gases of Thermal Treatment Facilities

9. NDN 108-0562-1827-1: Continuous determination of oil pipeline watercut, salinity, and API gravity regardless of gas fraction., The microwave watercut monitor

*Citations from ENGINEERING INDEX: EI2*

10. NDN 115-0033-9542-6: IN-LINE OIL MONITOR AND ITS ROLE IN ENGINE CONDITION MONITORING.

*Citations from INSPEC: INS*

11. NDN 174-0631-4109-4: Real-time monitor for hemodynamic beat-to-beat parameters and power spectra analysis of the biosignals

12. NDN 174-0561-6243-9: Design, commissioning and operational results of wide dynamic range BPM switched electrode electronics Ybeam position monitor"

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13. NDN 095-0233-5460-0: Method and apparatus for acoustic analysis of binary gas mixtures with continuous self-calibration PATENT NUMBER- 05581014

14. NDN 095-0226-3042-4: System for monitoring a dual voltage ungrounded system for leakage currents PATENT NUMBER- 05514964

15. NDN 095-0219-1210-0: System for measuring line to ground impedance PATENT NUMBER- 05450328

16. NDN 095-0218-9146-7: Monitor for an ungrounded system PATENT NUMBER- 05448491

17. NDN 095-0218-7111-0: System for calibrating a line isolation monitor PATENT NUMBER- 05446682

*Citations from U.S. Patent Bibliographic Database: PA2*

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18. NDN 167-0093-6809-1: Method for determining error sources in a wheel balancer PATENT  
NUMBER- 04338818

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Citations from AEROSPACE: AEO

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**1. The effects of age and physique on continuous-work capacity.**

AEO 72-00 7210568A NDN- 011-0000-1120-3

SNOOK, S. H., (Liberty Mutual Insurance Co., Hopkinton, Mass.)

Human Factors, vol. 13, Oct. 1971, p. 467-479.

**DOCUMENT TYPE- JOURNAL ARTICLE**

**AUTHOR AFFILIATION-** (Liberty Mutual Insurance Co., Hopkinton, Mass.)

**SUPPLEMENTARY NOTE(S) -** Age and physique effects on human continuous work capacity, monitoring heart rates during task performance

**SOURCE OF ABSTRACT-** O.H.

**LANGUAGE-** English

Two hypotheses concerning continuous work capacity were investigated - i.e., the capacity does not decrease with increasing age, and physique has a greater effect on the capacity during slower, heavier tasks than during faster, lighter tasks. Healthy male subjects of two age groups were employed to perform different manual handling tasks, and also a walking task. The continuous-work capacity of each subject was measured for each task by a psychophysical technique. Heart rates were monitored continuously during task performance. The results supported the age hypothesis. The physique hypothesis, however, was supported only by the results of the younger group of subjects.

**IDENTIFIER(S)-** AGE FACTOR; HEART RATE; HUMAN PERFORMANCE; PHYSICAL WORK

**SECONDARY IDENTIFIER(S)-** BODY TEMPERATURE; DATA CORRELATION; STANDARD DEVIATION; TABLES (DATA)

**COUNTRY CODE(S)-** UNITED STATES

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**2. The development of a laser fluorosensor for remote environmental probing.**

AEO 72-00 7210559A NDN- 011-0000-1102-1

MEASURES, R. M.; BRISTOW, M., (Toronto, University, Toronto, Canada)

ACS, AIAA, EPA, IEEE, ISA, NASA, and NOAA, Joint Conference on Sensing of Environmental Pollutants, Palo Alto, Calif., Nov. 8-10, 1971, 8 p.

**DOCUMENT TYPE- CONFERENCE PAPER**

**AUTHOR AFFILIATION-** (Toronto, University, Toronto, Canada)

**REPORT NUMBER(S)-** AIAA PAPER 71-1121

**SALES AGENCY AND PRICING-** MEMBERS, \$1.50; NONMEMBERS, \$2.00

**SUPPLEMENTARY NOTE(S)** - Laser fluorosensor for remote environmental probing, considering applications to oil slick mapping, locating lignin sulphonate pollution sources and hydrologic monitoring of tracer dye dispersal

**SOURCE OF ABSTRACT-** (Author)

**LANGUAGE-** English

The first phase of a development programme devoted to the exploitation of laser induced fluorescence for environmental sensing has been completed. A prototype Laser Fluorosensor has been constructed and used to evaluate, in the laboratory, the feasibility of this concept and to explore the potential range of applications. Special attention has been given to assessing the ability of a Laser Fluorosensor to map the extent of an oil slick, locate the source of lignin sulphonate pollution and monitor the dispersal of a tracer dye for hydrologic uses. The preliminary results of our study are encouraging and lead us to predict that a Laser Fluorosensor could be used for environmental sensing from an aircraft.

**IDENTIFIER(S)** - ENVIRONMENT POLLUTION; FLUORESCENCE; LASERS; REMOTE SENSORS; WATER POLLUTION

**SECONDARY IDENTIFIER(S)** - CONFERENCES; HYDROLOGY; LASER INDUCED FLUORESCENCE; LIGNIN; SULFONATES; TRACERS

**COUNTRY CODE(S)-** CANADA

---

**3. Abel transformation. Applications to fine structure using side-scatter on appropriate frequencies**

AEO 72-00 7210324N NDN- 011-0000-0637-2

ALBRECHT, H. J.

**DOCUMENT TYPE-** CONFERENCE PAPER

**SPONSOR-** F1944607 Forschungsinstitut fuer Hochfrequenzphysik, Werthhoven (Germany); Sponsored by Min. of Defence

**REPORT NUMBER(S)-** REPT-4-71

**SUPPLEMENTARY NOTE(S)** - Appropriate frequencies to monitor atmospheric composition and mixing using side-scattering with application to air pollution measurement

**SOURCE OF ABSTRACT-** ESRO

**LANGUAGE-** English

The extension of atmospheric side-scatter analysis to higher frequencies in the optical range is discussed. This technique enables the size of smaller particles, such as air pollutants, as well as atmospheric mixing, to be monitored. Propagation effects of side-scatter systems above cities are described, and a laser transmitter with a number of side-scatter receivers is proposed as an effective monitoring system.

**IDENTIFIER(S)** - AIR POLLUTION; ATMOSPHERIC COMPOSITION; ATMOSPHERIC SCATTERING; FREQUENCIES; MIXING

**SECONDARY IDENTIFIER(S)** - CITIES; CONFERENCES; INFRARED LASERS; MONITORS; NOMOGRAPHS; SCATTER PROPAGATION; SCATTERING COEFFICIENTS

**COUNTRY CODE(S)- GERMANY**

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Citations from Chemical Engineering Abstracts (CEA): CEA

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**4. PPM Ltd at IWEX apostrophe 97.**

CEA 28-12 CEB2812024622 NDN- 141-0035-8554-2

NO-AUTHOR

1997-09-22

**DOCUMENT TYPE-** Press Release

**ADDRESS-** Borough Green, Sevenoaks, Kent TN15 8DG  
UK

**NAMED COMPANY-** Pollution & Process Monitoring

**SECTION CROSS-REFERENCE CODE-** 23

**SECTION CROSS-REFERENCE-** Waste Treatment and Recycling

**LANGUAGE OF ABSTRACT-** English

**ORIGINAL LANGUAGE-** English

**LANGUAGE-** English

The PROTOC 2000 gives **continuous** online measurement of TOC values in real time for single or multiple sample streams. This instrument covers ranges from 0-10 ppm to 0-50,000 ppm, and includes a 4-20 mA output with two alarm relays. The New Waterfront Technology Amtox nitrification **monitor** for biological effluent treatment plants will perform acute toxicity tests in 30 minutes. This is available as an online or laboratory system. The Contronic **Auto** Dissolved Oxygen **monitor** features automatic cleaning, **in situ calibration**, and leak detection functions. The Turo T-611 portable water quality field instrument includes a range of sensors such as temperature, conductivity, dissolved oxygen, turbidity, pH and ORP.

**DESCRIPTOR(S)** - biological process; instrumentation; nitrification; oxygen analyzer; pollution monitoring; waste water treatment; water pollution control

**SECTIONAL CLASSIFICATION CODE-** 213; 226; 64

**SECTION HEADING CODE-** 13

**SECTION HEADING-** Control and process instrumentation

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Citations from Dissertation Abstracts: DIS

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**5. CHARGE-SIGN DEPENDENT SOLAR MODULATION OF 1-10 GEV COSMIC RAYS**

DIS 93-21-BK AAI9120464 NDN- 135-0108-5133-8

TUSKA, EVELYN B.

**VOL.** 52-02B

1990

**PP.** 890

315 page(s)

**CORPORATE AUTHOR-** UNIVERSITY OF DELAWARE**INSTITUTION CODE-** 0060**Degree-** PH.D.**SUBFILE CODE-** DAI**Document Order Number-** AAI9120464**Section-** The Sciences and Engineering**LANGUAGE-** English (DEF)

Previous experimental observations have indicated a clear variation with the solar cycle in the intensity of the galactic cosmic rays which reach earth. This "solar modulation" appears to exhibit a dependence on the sign of the cosmic ray particle charge, although to date this dependence has been established and verified (primarily) at energies below 1 GeV/n. Two distinct (but not necessarily mutually exclusive) theories offer explanations for such a dependence. Jokipii et al. (1970, 1977) have proposed gradient and curvature drifts in the interplanetary magnetic field as the charge-sign dependency mechanism. Bieber, Evenson, and Matthaeus (1987c) have suggested that a net magnetic helicity of the scattering turbulence could also cause the effect. A series of measurements of cosmic ray electrons begun in 1968 at the University of Chicago has been conducted by the University of Delaware Bartol Research Institute since 1984, using the same balloon-borne spectrometer. The MEH experiment on board the ISEE-3/ICE spacecraft, launched in late 1978, has returned a continuous and highly complementary data set. The balloon data have been re-verified using a self-calibration analysis method, and the ISEE-3/ICE MEH detector system has been modeled in detail in order to extend the analysis range of those data to include electron energies up to 12 GeV. Through analysis of these two distinct datasets, we have monitored the flux levels of electrons of energies from about 1 to 10 GeV during the time period 1968-1989. Heavy emphasis has been placed on the time period 1978-1987, when both LEE and ICE data are available. These data, in conjunction with neutron monitor data obtained during the same time period, indicate that the solar modulation of electrons in this rigidity range is remarkably different from that of protons of similar rigidities. Most notably, the electrons reach a much higher flux level during the 1987 solar minimum than during that of 1977, in distinction to protons which typically return to similar flux levels at successive solar minima. No clear understanding of this behavior emerges from current models of the charge-sign dependence of solar modulation. In this paper, we describe the data analysis methods, present the observations, explore the implications of these observations, and suggest that this apparent lack of symmetry may indicate a dynamical role of cosmic rays in the modulation process.

**DESCRIPTOR(S)-** PHYSICS, ASTRONOMY AND ASTROPHYSICS**SECTIONAL CLASSIFICATION CODE-** 0606

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Citations from DTIC: DOD

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**6. Development of an On-Line Organic Analyzer for the MUST Water Processing Element.**

DOD 97-58-BK a025-116 NDN- 013-0331-9479-5

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McNulty, Kenneth J.; Goldsmith, Robert L.; McCoy, John F.; Zakak, Alexandra

1976-05

28 page(s)

**CORPORATE AUTHOR-** ABCOR INC WILMINGTON MASS WALDEN RESEARCH DIV

**CORPORATE AUTHOR CODE-** 409707

**TITLE NOTE-** Final rept. 1 Mar 75-1 Mar 76, Unclassified

**CONTRACT NUMBER-** DAMD17-75-C-5051

**AVAILABILITY NOTE** - Regrading Category: Unclassified, Limitation: Unlimited Distribution, Abstract: Unclassified, Descriptors: Unclassified, Identifiers: Unclassified

**Document Order Number-** AD-A025-116

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A **continuous** organics **monitor** is required for the MUST water processing element in order to **monitor** the organics level of the treated effluent and to initiate process control action. The long-range objective of this program is the development of a simple, reliable, compact, low-cost TOC analyzer capable of continuously monitoring 'clean' MUST waste streams. As a first step in this development, a breadboard TOC **monitor** was designed, assembled, and tested to demonstrate the feasibility of using a **continuous** sample flow rate rather than discrete sample injections as used in most commercially available TOC analyzers. Based on **calibration** tests with potassium hydrogen phthalate, it is concluded that the accuracy, linearity, and sensitivity of the breadboard TOC **monitor** are comparable to those of commercially available TOC analyzers. Thus, the concept of **continuous** sample flow has been demonstrated. Operation of the breadboard TOC **monitor** indicated the need for a number of design and process modifications to improve the reliability and performance of the instrument.

**DESCRIPTOR(S)** - \*Organic compounds; \*Sewage treatment; \*Water quality Accuracy; Automatic; Effluents; Expandable structures; Flow charting; Hospitals; Modification; Monitoring; Ozonation; Performance; Recycled materials; Reliability; Reverse osmosis; Samplers; Sensitivity; Waste water; Water pollution

**IDENTIFIER(S)** - \*Design criteria; \*MUST(Medical units **self** contained transportable); \*Portable equipment; \*Total organic carbon; \*TOC analyzers

**SECTIONAL CLASSIFICATION CODE-** 140200; 240400

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#### 7. **SELF TEST AUTOMATIC SELF CALIBRATE AND INTEGRITY MONITOR AS APPLIED TO AVIONIC EQUIPMENT.**

DOD 97-14-BB x664-385 NDN-013-0314-8078-8

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NO-AUTHOR

1967-11-09

14 page(s)

**CORPORATE AUTHOR- BENDIX CORP BALTIMORE MD BENDIX AVIONICS DIV****CORPORATE AUTHOR CODE- 403437****TITLE NOTE- Unclassified****AVAILABILITY NOTE** - Regarding Category: Unclassified, Limitation: Unlimited Distribution, Abstract: Unclassified, Descriptors: Unclassified, Identifiers: Unclassified**SUPPLEMENTARY NOTE(S)** - Presented at FAA Maintenance Symposium 'Maintainability and Reliability of Aircraft Systems', Oklahoma City, Okla. 7-9 Nov 1967.**Document Order Number- AD-664-385**

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Self-test features in avionic equipment can be used either in flight or on the ground to assess proper system performance. Some self-test features are not only engineered to check performance of the system but also to facilitate precise adjustment of complex systems. In general, the self-test facility involves feeding a signal of known integrity into the input of the system and reading the answer output on the associated flight instrument. Feedback control to provide automatic error correction or **self calibration** is a logical extension of **self test** in avionic equipment. With automatic **self calibration** the test signal is continuously or periodically applied and if an error is detected it is automatically compensated for. Thus the effects of component aging or environmental changes which would tend to cause **calibration** errors are obviated insuring long service life of the system. A further extension of manual **self test** and automatic **self calibrate** is **integrity monitor** which in effect is **continuous 'on-line' self test**. The comparatively low confidence level of the warning circuits in avionic systems has been recognized by the industry for a number of years. At best, from a consideration of the circuit logic involved, the warning flags have done not much more than indicate the presence or absence of guidance signals. Safety of flight and especially of low approach and auto-land operations is intimately dependent upon the reliability and accuracy of the associated avionic sub-systems. Thus, if the output data of the guidance systems is for any reason unusable the warning circuits must be activated. **Integrity monitor** is the answer to this requirement. (Author)

**DESCRIPTOR(S)** - \*(COMMERCIAL PLANES; \*(FLIGHT INSTRUMENTS; \*FLIGHT INSTRUMENTS); \*RELIABILITY) ALTIMETERS; APPROACH; AUTOMATIC; **CALIBRATION**; CIRCUITS; CYBERNETICS; DOPPLER NAVIGATION; GROUND SUPPORT EQUIPMENT; JET TRANSPORT PLANES; MAINTENANCE; MONITORS**IDENTIFIER(S)- \*AVIONICS****SECTIONAL CLASSIFICATION CODE- 010309; 010400; 130800**

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Citations from Energy Science and Technology (DOE): EDB

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**8. Continuous Emission Monitor for Toxic Metals in the Off-Gases of Thermal Treatment Facilities**

EDB 99-18 99:077217 00000001970 NDN- 108-0672-4291-5

Gary Loge.(M).

1998-12-01

Yvp" page(s)

**DOCUMENT TYPE-** Report

**CORPORATE AUTHOR-** Federal Energy Technology Center, Morgantown, WV, and Pittsburgh, PA (United States)

**LOCATION OF WORK-** US

**SPONSORING AGENCY-** USDOE

**MEDIUM** - 1766, PDFN1782, MAUREEN ENOS, ENOS@FETC.DOE.GOV, 412/892-6101, FEDERAL ENERGY TECHNOLOGY CENTER

**CONTRACT/GRANT NUMBER-** DOEAC21-96MC32194

**REPORT NUMBER(S)-** DE-AC21-94MC32194--99

**SUBFILE CODE-** ELC

**PUBLICATION COUNTRY-** US

**ANNOUNCEMENT CODE-** EDB; ETD

**Document Order Number-** DE00001970

**ANNOUNCEMENT IDENTIFICATION-** FETC; EDB-99:077217

**LANGUAGE-** English

Self-calibration procedures for continuous monitoring of toxic metals in the off-gases of thermal treatment facilities using laser-induced breakdown spectroscopy (LIBS) were tested. The tests were performed using a heated aerosol/gas flow system that generated simulated off-gas conditions with calibrated amounts of metal in an optical cell. Calibration curves of LIBS signal for metal concentration in the cell were obtained for various gas and optical conditions. Gas conditions that were varied include water in either vapor and condensed aerosol droplet form, the presence of easily ionizable elements (i. e., potassium), speciation of the metal analyte, and the gas temperature. In addition, laser pulse energy, focal length, and detector alignment were independently varied. Two different sets of calibration curves were obtained, one set with Mn(II) and N(II) emission obtained simultaneously and a second set with Cd(I) and Cd(II) emission obtained simultaneously with N(I) emission obtained in a sequential manner. For both sets of data, calibration curves were obtained using 1) single line intensities, 2) the ratio of metal singleline intensity to nitrogen single line intensity, and 3) the ratio of total metal emission to total nitrogen emission obtained using the temperature and electron density. Results show that correction using the ratio of metal single line intensity to nitrogen single line intensity does help in maintaining a constant slope of calibration curves for various conditions. However, the total emission self-calibration procedure shows better performance in most cases.

**DESCRIPTOR(S)-** EMISSION; METALS; SPECTROSCOPY **IDENTIFIER(S)-** ELEMENTS

**SECTIONAL CLASSIFICATION CODE-** 010000

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9. Continuous determination of oil pipeline watercut, salinity, and API gravity regardless of gas fraction., The microwave watercut monitor

EDB 92-13 92:093980 92000739078 NDN- 108-0562-1827-1

Marelli, J. D.; Hatton, G. J.; Siddiqui, F.; Pepin, L. L.; Helms, D. A., (Texaco Inc. (US))

1992

**PP.** 739-752

824 page(s)

**DOCUMENT TYPE-** Book Analytic

**MONOGRAPH TITLE-** Proceedings of the 1992 SPE international meeting on petroleum engineering

**AUTHOR AFFILIATION-** Texaco Inc. (US)

**LOCATION OF WORK-** US

**LITERARY INDICATOR(S)-** Conference

**AVAILABILITY LIMITER-** Society of Petroleum Engineers, P.O. Box 833836, Richardson, TX 75083 (United States)

**REPORT NUMBER(S)-** CONF-920329--

**SUPPLEMENTARY NOTE(S)-** Technical Paper SPE 22401

**SUBFILE CODE-** NOV

**PUBLISHER-** Society of Petroleum Engineers

**PUBLICATION PLACE-** R

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### *Citations from AEROSPACE: AEO*

2. NDN 011-0075-5969-0: Measurements of the conduction of heat in water vapor, nitrogen and mixtures of these gases in an extended temperature range

### *Citations from AEROSPACE (1962-1971): AEI*

3. NDN 150-0021-8417-6: Device for measuring turbulent fluctuations of conductivity and temperature of sea water

### *Citations from Chemical Engineering Abstracts (CEA): CEA*

4. NDN 141-0038-4485-7: Possibility of detection of crack initiation in high temperature water .

### *Citations from Dissertation Abstracts: DIS*

5. NDN 135-0080-7621-9: THE USE OF MINIATURE FOUR-ELECTRODE CONDUCTIVITY PROBES FOR HIGH RESOLUTION MEASUREMENT OF TURBULENT DENSITY OR TEMPERATURE VARIATIONS IN SALT-STRATIFIED WATER FLOWS

*Citations from DTIC: DOD*

6. DOD AD-276-747: MEASUREMENT OF TEMPERATURE, SALINITY, AND VELOCITY OF WATER THROUGH ELECTROLYTIC CONDUCTIVITY MEASUREMENTS

*Citations from Energy Science and Technology (DOE): EDB*

7. NDN 108-0539-5439-0: Structural material anomaly detection system using water chemistry data, 6., Application of high temperature electrical conductivity monitor in advanced water chemistry diagnosis

*Citations from Energy Science and Technology (DOE): ED1*

8. NDN 168-0458-1754-0: Structural material anomaly detection system using water chemistry data, 3. In-line monitors for electrical conductivity of high temperature water

9. NDN 168-0406-2235-0: Temperature dependence and measurement of resistivity of pure water

10. NDN 168-0389-1876-0: The detection of ground water flow by precise temperature measurements in boreholes

11. NDN 168-0250-1142-3: Analytical and experimental determination of the temperature distribution in stratified hot water stores

*Citations from Energy Science and Technology (DOE): ED2*

12. NDN 130-0046-7366-0: Theoretical and experimental determination of the temperature distribution in stratified warm water reservoirs

*Citations from ENGINEERING INDEX: EI*

13. NDN 017-0301-8294-7: Evaluation of in-situ measurements of water temperature, specific conductance, and pH in low ionic strength streams

14. NDN 017-0170-7805-6: Soil water movement in response to temperature gradients. Experimental measurements and model evaluation.

15. NDN 017-0160-8002-0: Continuous measurement of effective thermal conductivity of well cuttings. Water mixture at geothermal conditions by hot-wire method under transient temperature field.

*Citations from Engineering Index (1983-1989): EI*

16. NDN 163-0220-3103-9: STRUCTURAL MATERIAL ANOMALY DETECTION SYSTEM USING WATER CHEMISTRY DATA, (III). IN-LINE MONITORS FOR ELECTRICAL CONDUCTIVITY OF HIGH TEMPERATURE WATER.

17. NDN 163-0208-4767-0: DIELECTRIC BEHAVIOR OF ADSORBED WATER . . . 3. MEASUREMENT AT ROOM TEMPERATURE ON ZnO.

18. NDN 163-0190-4257-5: THERMAL CONDUCTIVITY MEASUREMENT OF HEAVY WATER OVER A WIDE RANGE OF TEMPERATURE AND PRESSURE.

19. NDN 163-0170-4259-6: Continuous Detection of Physico-Chemical Parameters of Water (Temperature, Conductivity) Sodium in Karstic Sources in Swiss Jura. Technology of Hydrologic Measurements and Interpretations.

*Citations from INSPEC: IN1*

20. NDN 083 0515 1053 4: Measurement of water flow velocity by analysis of short temperature steps

21. NDN 083-0379-3367-7: Structural material anomaly detection system using water chemistry data. (VI). Application of high temperature electrical conductivity monitor in advanced water chemistry diagnosis

*Citations from INSPEC (80-89): IN2*

22. NDN 161-0292-9134-3: Dielectric behaviour of adsorbed water . I. Measurement at room temperature on TiO<sub>sub 2</sub>/

23. NDN 161-0218-5723-4: Water temperature measurements in turbulent streams during periods of frazil-ice formation

*Citations from U.S. Patent Bibliographic Database: PAT*

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24. NDN 175-0362-0895-0: Method of determination of active ions by electric conductivity and electric conductivity . metering . system . therefor . . . PATENT NUMBER- 06034520

25. NDN 175-0345-1947-2: Electromagnetic field perturbation sensor and methods for measuring water content in sheetmaking systems . PATENT NUMBER- 05954923

26. NDN 175-0313-2327-0: Apparatus for the measurement of dissolved carbon in deionized water . PATENT NUMBER- 05798271

*Citations from U.S. Patent Bibliographic Database: PA1*

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27. NDN 095-0218-4193-2: Method for the determination of dissolved carbon in water PATENT NUMBER- 05443991

28. NDN 095-0199-4800-7: Instrument and method for measurement of the organic carbon content of water PATENT NUMBER- 05275957

29. NDN 095-0183-5672-8: Method and apparatus for the determination of dissolved carbon in water PATENT NUMBER- 05132094

30. NDN 095-0180-8243-4: Means and method for determining the conductance of a fluid PATENT NUMBER- 05107219

31. NDN 095-0170-5830-8: Instrument for measurement of the organic carbon content of water PATENT NUMBER- 05047212

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32. NDN 167-0152-6035-0: Method and apparatus for measuring water content PATENT NUMBER- 04886088

33. NDN 167-0152-3516-0: Electrode assembly for in-situ measurement of electroiytic conductivity of boiler water PATENT NUMBER- 04883566

34. NDN 167-0149-3625-7: Water quality control method, and method and apparatus for measuring electrical conductivity used in the water quality control PATENT NUMBER- 04853638

35. NDN 167-0146-2772-8: System and method for detecting contaminants in a steam power generating system PATENT NUMBER- 04822744

36. NDN 167-0138-4921-3: Detection of exhaust gas spillage from naturally aspirated gas furnaces and naturally aspirated gas hot water heaters PATENT NUMBER- 04751912

37. NDN 167-0130-2853-9: Double indicator pulmonary edema measurement PATENT NUMBER- 04676252

38. NDN 167-0105-3558-0: Method for determining the pH value of deionized water PATENT NUMBER- 04445091

39. NDN 167-0086-5631-3: Method and means for measuring moisture content of hermetic semiconductor devices PATENT NUMBER- 04272986

40. NDN 167-0086-2731-3: Apparatus and method for determining electrical conductivity of water vapor PATENT NUMBER- 04270084

41. NDN 167-0084-3906-5: Apparatus for and method of determining high pressure, high temperature feedwater contaminants PATENT NUMBER- 04251220

*Citations from U.S. Patent Bibliographic Database: PA3*

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42. NDN 166-0053-4442-1: LIQUID CONDUCTIVITY MEASURING APPARATUS PATENT NUMBER- 03963979

43. NDN 166-0048-5381-2: METHOD AND MEANS FOR QUANTITATIVE ANALYSIS OF SULFURIC ACID-CONTAINING GASES - - - PATENT NUMBER- 03915646

44. NDN 166-0047-6092-5: STANDARD CONDUCTIVITY CELL FOR MEASUREMENT OF SEA WATER SALINITY AND TEMPERATURE - - - PATENT NUMBER- 03906354

45. NDN 166-0044-9978-0: WATER QUALITY ANALYSIS SYSTEM WITH MULTICIRCUIT SINGLE SHELL HEAT EXCHANGER PATENT NUMBER- 03880226

46. NDN 166-0044-8208-1: STANDARD CONDUCTIVITY CELL FOR MEASUREMENT OF SEA WATER SALINITY AND TEMPERATURE - - - PATENT NUMBER- 03878456

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*Citations from RSC ANALYTICAL ABSTRACT: AAN*

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1. Use of a temperature programmed injector with a packed liner for direct water analysis and online reversed-phase LC-GC.

AAN 56-03 AAN5603H00128 NDN- 096-0003-9307-6

Mol, H. G. J.; Janssen, H.-G.; Cramers, C. A.; Brinkman, U. A. T.

**JOURNAL NAME-** J. High Resolut. Chromatogr.

**VOL.** 16

**NO.** 8

Aug 1993

**PP.** 459-463

**DOCUMENT TYPE-** Journal Article

**CODEN-** JHRCE7

**CORPORATE AUTHOR-** Eindhoven Univ. Technol., Lab. Instrumental Anal.

**ADDRESS-** 5600 MB Eindhoven

Netherlands

**LANGUAGE-** English

A system that allows large vol. (up to 1 ml) of water to be introduced in capillary GC is described. Water elimination was carried out in the solvent split mode in a programmed temp. vaporizing injector containing a Tenax liner. The water and analytes in the liner were separated by evaporative and non-evaporative methods. Sampling of the liner in the solid-phase extraction mode gave the best sampling times and recoveries and allowed higher introduction flow rates, e.g., 250.mu.l/min for 500.mu.l samples. A thermal conductivity detector was used to monitor water elimination from the liner, as drying times were not constant. After thermal desorption and refocusing of the analytes, GC separation was carried out using a column (25 m.times. 0.32 mm) coated with HP-Ultra-1 (0.52.mu.m), with temp. programming from 80.degree. C (held 2 min) to 210.degree. C (held 1 min) at 10.degree. C/min and FID. Quantitative recoveries were obtained for organic pollutants with b.p. >200.degree. C, ranging from 2,6-dimethylphenol to phenanthrene, at introduction temp. of 30 and 50.degree. C. More volatile compounds were partially lost, but the repeatability of the recoveries was acceptable. The detection limits were in the sub-ppb range.

**ANALYTE INDEX** - pollutants --detmn. of organic, in water, by online LC-GC, injector for; organic compounds --detmn. of, in water, by online LC-GC, injector for

**CONCEPT INDEX** - chromatography, liquid --coupled with GC, in environmental analysis; chromatography, gas --coupled with LC, in environmental analysis

**MATRIX INDEX** - waters, natural --detmn. of organic pollutants in, by online LC-GC, injector for; waters, potable --detmn. of organic pollutants in, by online LC-GC, injector for

**SECTIONAL CLASSIFICATION CODE** - H20000

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Citations from AEROSPACE: AEO

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**2. Measurements of the conduction of heat in water vapor, nitrogen and mixtures of these gases in an extended temperature range**

AEO 83-00 8342671A NDN- 011-0075-5969-0

FROHN, A.; WESTERDORF, M., (Stuttgart, Universitaet, Stuttgart, West Germany)

IN: Heat transfer 1982; Proceedings of the Seventh International Conference, Munich, West Germany, September 6-10, 1982. Volume 2 (A83-42663 20-34). Washington, DC, Hemisphere Publishing Corp., 1982, p. 99-104.

**DOCUMENT TYPE**- CONFERENCE PAPER

**AUTHOR AFFILIATION**- (Stuttgart, Universitaet, Stuttgart, West Germany)

**SUPPLEMENTARY NOTE(S)**- Measurements of the conduction of heat in water vapor, nitrogen and mixtures of these gases in an extended temperature range

**SOURCE OF ABSTRACT**- M.S.K.

**LANGUAGE**- English

Experimental and analytical results are presented from trials with heat conduction in water vapor, nitrogen, and mixtures of the two in a cylindrical heat transfer cell. The pressures examined ranged from 100-0.01 mbar, corresponding to Knudsen numbers of 0.01-100. Formulations are defined for the continuum conditions, the free molecule conditions, the transition region, and the momentum equation solution. Experimentation with an instrumented configuration of an inner and outer cylinder over the

temperature range 300-725 K is described, noting the use of a vacuum around the inner, gas-filled container in order to measure the radiative heat losses. The results are useful for predicting heat transfer in high altitude flight or among small droplets in natural fogs, cooling towers, and combustion chambers.

**IDENTIFIER(S)** - CONDUCTIVE HEAT TRANSFER; GAS MIXTURES; KNUDSEN FLOW; NITROGEN; THERMAL CONDUCTIVITY GAGES; WATER VAPOR

**SECONDARY IDENTIFIER(S)** - AERODYNAMIC HEAT TRANSFER; FREE MOLECULAR FLOW; TEMPERATURE DEPENDENCE; TRANSITION FLOW

**COUNTRY CODE(S)** - GERMANY

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Citations from AEROSPACE (1962-1971): AE1

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**3. Device for measuring turbulent fluctuations of conductivity and temperature of sea water**

AEO 67-00 6722379N NDN- 150-0021-8417-6

ARETINSKIY, G. YU.; KHRISTOFOROV, G. N.

IN ITS METHODS AND INSTR. FOR MARINE RES. 13 FEB. 1967 P 192-201 REFS /SEE N67-22358 11-14/ CFSTI- HC \$3.00

**DOCUMENT TYPE**- TECHNICAL REPORT

**SUPPLEMENTARY NOTE(S)**- Device for measuring turbulent fluctuations of electric conductivity and temperature in sea water

**LANGUAGE**- English

NO-ABSTRACT

**DESCRIPTOR(S)** - ELECTRIC CONDUCTIVITY ; SEA WATER; TEMPERATURE MEASUREMENT; TURBULENCE MEASURING APPARATUS

**SECONDARY DESCRIPTOR(S)** - APPARATUS; AUTOMATION; CHANNEL; CIRCUIT; CONDUCTIVITY ; CONSTANT; DESIGN; ELECTRIC; ELECTRONIC; FLUCTUATION; MEASUREMENT; MEASURING; OPERATION; SEA; TEMPERATURE; TIME; TURBULENCE; USSR; WATER

**IDENTIFIER(S)**- ELECTRICAL RESISTIVITY; SEA WATER; TEMPERATURE MEASUREMENT; TURBULENCE METERS; TURBULENT FLOW; WATER TEMPERATURE

**COUNTRY CODE(S)**- USSR

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Citations from Chemical Engineering Abstracts (CEA): CEA

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**4. Possibility of detection of crack initiation in high temperature water .**

CEA 30-02 CEB3002002324 NDN- 141-0038-4485-7

Dorsch, T.; Kilian, R.; Wendler-Kalsch, E.

**JOURNAL NAME-** Materials and Corrosion

**VOL. 49**

**NO. 9**

**1998**

**PP. 659-670**

**DOCUMENT TYPE-** Journal

**ISSN-** 0947-5117

**CODEN-** MTCREQ

**AUTHOR AFFILIATION-** Universitaet Erlangen-Nuernberg, Erlangen, Germany; Siemens

**SECTION CROSS-REFERENCE CODE-** 15

**SECTION CROSS-REFERENCE-** Analysis and testing of materials

**LANGUAGE OF ABSTRACT-** English

**ORIGINAL LANGUAGE-** English

**LANGUAGE-** English

Intergranular stress corrosion cracking of austenitic stainless steels is still a serious problem in the heat affected zone of pipings and other components in boiling water reactors. Aim of the presented work was to use electrochemical noise measurement technique to detect crack initiation as well as to check the feasibility of this technique in corrosion systems with extremely low conductivity. Tests were performed using pre-oxidized, unnotched standard tensile round bar specimens made from Nb-stabilized austenitic stainless steel, material no. 1. 4550, under constant load conditions in pressurized high temperature water at a temperature of 290 Cel, a pressure of 7 MPa and a pH-value of 7. Oxygen content was 200 ppb and the conductivity less than 0. 2 muS/cm. The elementary transients associated with stress corrosion crack initiation were found to be embedded in the basic noise pattern coming from the oxide growth reaction on the specimen surface and are therefore not easily to detect in the time records. Thus a simple calculation of the standard deviations is only sufficient for the evaluation of general corrosion behaviour but cannot be used to identify localised corrosion phenomena under high temperature water conditions. The changes in the track of power density spectra proved to be much more suitable to indicate stress corrosion crack initiation under these conditions. (Drodtten)

**DESCRIPTOR(S)** - analytical instrumentation; corrosion; corrosion monitoring; damage location; electrochemical cell; electrochemical monitoring; electrochemistry; steel corrosion; stress corrosion cracking

**SECTIONAL CLASSIFICATION CODE-** 861; 8523; 863

**SECTION HEADING CODE-** 11

**SECTION HEADING-** Corrosion and corrosion prevention

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Citations from Dissertation Abstracts: DIS

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## 5. THE USE OF MINIATURE FOUR-ELECTRODE CONDUCTIVITY PROBES FOR HIGH RESOLUTION MEASUREMENT OF TURBULENT DENSITY OR TEMPERATURE VARIATIONS IN SALT-STRATIFIED WATER FLOWS

DIS 93-14-BK AAI8312227 NDN- 135-0080-7621-9

HEAD, MICHAEL JAY

**VOL.** 44-01B

1983

**PP.** 256

234 page(s)

**CORPORATE AUTHOR-** UNIVERSITY OF CALIFORNIA, SAN DIEGO

**INSTITUTION CODE-** 0033

**Degree-** PH.D.

**SUBFILE CODE-** DAI

**Document Order Number-** AAI8312227

**Section-** The Sciences and Engineering

**LANGUAGE-** English (DEF)

A description of the design, construction, and testing of miniature, four-electrode cell conductivity instrument is presented. An analytic calculation for the spatial resolution of both a single-electrode instrument and a four-electrode instrument is given. A description of the physical processes that cause electrode surface impedance is given. A summary of the published measurements of the density, temperature, conductivity relation for sodium chloride in water is given. Observations of density-density spatial correlations downstream of a biplane grid in a stratified flow are presented. The four-electrode cell consists of four platinum wires supported by a tapered glass structure. The dimensions of the measuring volume of this cell are sub-millimeter. The cell is the freely-exposed type; no current focusing structures are used. The time response of the four-electrode cell is tested by passing the cell through a laminar, 2-d jet at different speeds. The spatial-variation power spectra are computed. No clear velocity effect is observed, indicating that time response isn't an important parameter for the cell in the velocity range tested, 15 to 100 cm/sec. The spatial resolution of the four-electrode cell is measured on a turbulent flow by comparing the resulting spatial power spectra of conductivity to the theoretical Batchelor spectrum. A spatial response function is found and compared to the spatial response function calculated from an approximate solution of the potential distribution around the cell. This is also done for the single-electrode cell. Reasonable agreement is observed between the measured and calculated spatial response functions. The half power spatial frequency of the four-electrode cell is found to be approximately 4 cyc/cm. For the single-electrode cell the half power wavenumber is about  $0.06/r_{(o)}$  cyc/cm. The scientific publications pertaining to electrode surface impedance of platinum electrodes are investigated. Electrode-solution conduction is found to occur in a capacitive manner. The observed frequency dependence is explained as being the result of the electrode's surface topography.

**DESCRIPTOR(S)-** ENGINEERING, ELECTRONICS AND ELECTRICAL

**SECTIONAL CLASSIFICATION CODE-** 0544

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Citations from DTIC: DOD

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## **6. MEASUREMENT OF TEMPERATURE, SALINITY, AND VELOCITY OF WATER THROUGH ELECTROLYTIC CONDUCTIVITY MEASUREMENTS**

DOD 97-60-BB x276-747 NDN- 013-0303-8968-6

If you are a registered Defense Technical Information Center (DTIC) user, please order directly from DTIC at 800-225-3842. Otherwise, please order from NTIS at 800-553-NTIS. Use order number-

AD-276-747.

HIGGINS,L.L.

1962-03-15

1v page(s)

**CORPORATE AUTHOR-** TRW SPACE TECHNOLOGY LABS LOS ANGELES CALIF

**CORPORATE AUTHOR CODE-** 354560

**TITLE NOTE-** Unclassified

**AVAILABILITY NOTE-** Availability: Document partially illegible., Regrading Category: Unclassified, Limitation: Unlimited Distribution; Microfiche only, Abstract: Unclassified, Descriptors: Unclassified

**Document Order Number-** AD-276-747

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A new technique is studied for the simultaneous, independent and continuous measurement of the temperature, salinity and velocity at a point in a flowing water solution by means of electrical measurements of the electrolytic conductivity and dielectric constant of the medium. The instrumentation is capable of high sensitivity and rapid response, limited only by the physical size of the probe, and small sensors are relatively easy to construct in a simple and durable configuration. The methods are applied to measurements in sea water and tap water. (Author)

**DESCRIPTOR(S) -** \*PHYSICAL PROPERTIES; \*WATER DIELECTRIC PROPERTIES; ELECTROLYSIS; MEASUREMENT; SALINITY; SEA WATER; TEMPERATURE; VELOCITY

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Citations from Energy Science and Technology (DOE): EDB

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7. Structural material anomaly detection system using water chemistry data, 6., Application of high temperature electrical conductivity monitor in advanced water chemistry diagnosis

EDB 91-07 91:038562 91000423462 NDN- 108-0539-5439-0

Asakura, Yamato, Nagase, Makoto; Kondou, Masayoshi; Uchida, Shunsuke, (Hitachi Ltd., Ibaraki (Japan). Energy Research Lab.); Ohsumi, Katsumi

**JOURNAL NAME-** Journal of Nuclear Science and Technology (Tokyo) (Japan)

**ABBREVIATED JOURNAL TITLE-** J. Nucl. Sci. Technol. (Tokyo)

**VOL.** 27

**NO.** 9

1990-09

**PP.** 815-826

**DOCUMENT TYPE-** Journal Article

**ISSN-** 0022-3131

**CODEN-** JNSTA

**AUTHOR AFFILIATION-** Hitachi Ltd., Ibaraki (Japan). Energy Research Lab.

**LOCATION OF WORK- JP****SUBFILE CODE- JPN****PUBLICATION COUNTRY- JP****ANNOUNCEMENT CODE- EDB; ETD****INCOMING TAPE SERIAL NUMBER- JP9102125****ANNOUNCEMENT IDENTIFICATION- JPN-91:002125; EDB-91:038562****LANGUAGE- English**

The developed high temperature electrical conductivity monitor is applied to the following three items: (1) Determination of the dissociation constant of an aqueous impurity at elevated temperatures up to 300degC; (2) On-line chemical analysis of an aqueous impurity by using the known, significant difference in temperature dependence of electrical conductivity for different chemical forms; (3) More reliable prediction of the effects of an aqueous impurity on the corrosion rate at elevated temperatures by using the conductivity at the corroding temperature instead of the one at room temperature. Obtained results suggest that high temperature conductivity monitoring is effective for implementing an advanced in-service anomaly detection system, using water chemistry data, in nuclear power plants. (author).

**DESCRIPTOR(S)-** \*WATER CHEMISTRY --Electric conductivity BWR TYPE REACTORS; CHEMICAL ANALYSIS; CORROSION; DISSOCIATION; ELECTRODES; HIGH TEMPERATURE; IMPURITIES; TEMPERATURE DEPENDENCE **IDENTIFIER(S)-** CHEMICAL REACTIONS; CHEMISTRY; ELECTRICAL PROPERTIES; PHYSICAL PROPERTIES; REACTORS; WATER COOLED REACTORS; WATER MODERATED REACTORS

**SECTIONAL CLASSIFICATION CODE- 210100**

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Citations from Energy Science and Technology (DOE): ED1

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**8. Structural material anomaly detection system using water chemistry data, 3. In-line monitors for electrical conductivity of high temperature water**

EDB 88-03 88:016181 8712560757 NDN- 168-0458-1754-0

Asakura, Yamato; Uchida, Shunsuke

**JOURNAL NAME- J. Nucl. Sci. Technol. (Tokyo)**

**VOL. 24**

**NO. 8**

1987-08

**PP. 632-638**

**DOCUMENT TYPE- Journal Article**

**ISSN- 0022-3131**

**CODEN- JNSTA**

**AUTHOR AFFILIATION- Hitachi Ltd., Ibaraki, Japan. Energy Research Lab.**

**LOCATION OF WORK- JP**

**SUBFILE CODE- JPN**

**PUBLICATION COUNTRY- JP**

**ANNOUNCEMENT CODE- EDB**

## ANNOUNCEMENT IDENTIFICATION- JPN-87:060757; EDB-88:016181

A method to determine the electric conductivity of water continuously and directly at elevated temperature up to 300 deg C was developed which can be applied as a sensor for corrosion behavior foreknowledge and diagnosis systems using water chemistry data of BWR primary coolant. Complex impedance was measured between a couple of parallel platinum electrodes installed with a constant distance and dipped in the water. By analyzing frequency dependence of the impedance, the resistivity of the water between the platinum electrodes was estimated separately from the impedance caused by surface reactions on the platinum electrodes, which was the source of error in the measurement of electrical conductivity at elevated temperature. Increase of necessary frequency to obtain the surface impedance at elevated temperature was evaded by the extrapolation of the frequency dependence of the impedance with calculations by using the data up to 100 kHz in which electric conductivity shows negligibly small dependence on the frequency of applied voltage. The measured conductivity of pure water up to 300 deg C showed a good agreement with the calculation based on the dissociation data of water, which shows the applicability for the in-line monitor of electrical conductivity at elevated temperature.

**descriptor(s)**- \*BWR TYPE REACTORS --Reactor monitoring systems; \*PRIMARY COOLANT CIRCUITS --Corrosion; \*PRIMARY COOLANT CIRCUITS --Monitoring; \*WATER CHEMISTRY --Monitoring; ELECTRIC CONDUCTIVITY; ELECTRIC IMPEDANCE; ELECTRIC MEASURING INSTRUMENTS; FREQUENCY DEPENDENCE; HIGH TEMPERATURE; IMPURITIES; SODIUM SULFATES  
**Identifier(s)**- ALKALI METAL COMPOUNDS; CHEMICAL REACTIONS; CHEMISTRY; COOLING SYSTEMS; ELECTRICAL EQUIPMENT; ELECTRICAL PROPERTIES; ENERGY SYSTEMS; EQUIPMENT; IMPEDANCE; MEASURING INSTRUMENTS; OXYGEN COMPOUNDS; PHYSICAL PROPERTIES; REACTOR COMPONENTS; REACTOR COOLING SYSTEMS; REACTORS; SODIUM COMPOUNDS; SULFATES; SULFUR COMPOUNDS; WATER COOLED REACTORS; WATER MODERATED REACTORS

**SECTIONAL CLASSIFICATION CODE**- 210100

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**9. Temperature dependence and measurement of resistivity of pure water**  
EDB 85-09 85:062887 8504526282 NDN- 168-0406-2235-0

Light, T. S.

**JOURNAL NAME**- Anal. Chem.

**VOL.** 56

**NO.** 7

1984-06

**PP.** 1138-1142

**DOCUMENT TYPE**- Journal Article

**ISSN**- 0003-2700

**CODEN**- ANCHA

**AUTHOR AFFILIATION**- Foxboro Co., MA

**LOCATION OF WORK**- US

**LITERARY INDICATOR(S)**- Numerical Data

**PUBLICATION COUNTRY**- US

**ANNOUNCEMENT CODE**- EDB

**ANNOUNCEMENT IDENTIFICATION**- ERA-10:021283; EDB-85:062887

High purity water with ionic impurities of less than 0.1  $\mu\text{g}/\text{kg}$  is commercially available. Its quality may be monitored by resistivity measurement corrected for temperature and trace impurities. This paper calculates improved theoretical resistivity, conductivity, temperature coefficient, and pH values for water from 0 to 100  $^{\circ}\text{C}$ . These values are reported for the first time from 100 to 300  $^{\circ}\text{C}$ . The detection of trace ionic impurities as low as 0.1  $\mu\text{g}/\text{kg}$  is discussed, as is the maximum resistivity of water occurring at pH 7.04 at 25  $^{\circ}\text{C}$  and sodium hydroxide concentration of 0.8  $\mu\text{g}/\text{kg}$ . 18 references, 4 figures, 7 tables.

**descriptor(s)**- \*ACID HALIDES; \*ELECTRIC CONDUCTIVITY; \*ELECTRICAL TESTING; \*EXPERIMENTAL DATA; \*MEDIUM TEMPERATURE; \*PH VALUE; \*POTASSIUM CHLORIDES; \*SODIUM CHLORIDES; \*SODIUM HYDROXIDES; \*TEMPERATURE DEPENDENCE; \*WATER --Electric conductivity, HIGH TEMPERATURE; IMPURITIES  
**Identifier(s)**- ALKALI METAL COMPOUNDS; CHLORIDES; CHLORINE COMPOUNDS; DATA; ELECTRICAL PROPERTIES; HALIDES; HALOGEN COMPOUNDS; HYDROGEN COMPOUNDS; HYDROXIDES; INFORMATION; MATERIALS TESTING; NONDESTRUCTIVE TESTING; NUMERICAL DATA; ORGANIC COMPOUNDS; ORGANIC HALOGEN COMPOUNDS; OXYGEN COMPOUNDS; PHYSICAL PROPERTIES; POTASSIUM COMPOUNDS; SODIUM COMPOUNDS; TESTING

**SECTIONAL CLASSIFICATION CODE**- 400201

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10. The detection of ground water flow by precise temperature measurements in boreholes  
 EDB 84-24 84:190775 8411523156 NDN- 168-0389-1876-0

Drury, M. J.; Jessop, A. M.; Lewis, T. J.

**JOURNAL NAME**- Geothermics

**VOL.** 13

**NO.** 3

1984

**PP.** 163-174

**DOCUMENT TYPE**- Journal Article

**ISSN**- 0375-6505

**CODEN**- GTMCA

**AUTHOR AFFILIATION**- Earth Physics Branch, Energy, Mines and Resources Canada, Sidney, BC

**LOCATION OF WORK**- CA

**PUBLICATION COUNTRY**- US

**ANNOUNCEMENT CODE**- EDB

**ANNOUNCEMENT IDENTIFICATION**- EDB-84:190775

The flow of water is a very effective means for the transfer of heat, and one method of detecting such flow is to make precise temperature measurements at closely spaced intervals in a borehole that intersects a flow zone. Water can flow through permeable formations; within a borehole it can flow between two aquifers or fracture systems; it can flow into a fracture system during the drilling of a borehole; and it can flow up or down narrow, dipping fracture zones. Each of these phenomena produces a characteristic thermal signature on a borehole temperature log that can be modelled mathematically. Analysis of such thermal anomalies permits, therefore, a quantitative estimate to be made of the amount and rate of fluid

flow. In principle, very small flow rates can be detected from their thermal effects, but in practice other factors, such as thermal conductivity variations, can cause variations in thermal gradients that limit the detectability. Anomalies that persist over large depth ranges compared with the diameter of the borehole can generally be interpreted unambiguously. Examples of each type of flow are given.

IDENTIFIER(S)- CAVITIES; CHEMICAL REACTIONS; DECOMPOSITION; ENERGY TRANSFER; FLUID FLOW; FLUID MECHANICS; HYDROGEN COMPOUNDS; LYSIS; MECHANICS; OXYGEN COMPOUNDS; SOLVOLYSIS; TEMPERATURE GRADIENTS; WATER

## SECTIONAL CLASSIFICATION CODE- 580100

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### 11. Analytical and experimental determination of the temperature distribution in stratified hot water stores

EDB 80-01 80:001148 7912023879 NDN- 168-0250-1142-3

Leyers, H. J.; Scholz, F.; Tholen, A.  
EDITOR- Hoogendoorn, C. J.; Afgan, N. H.

1978

683-693 page(s)

DOCUMENT TYPE- Book Analytic

MONOGRAPH TITLE- Energy conservation in heating, cooling, and ventilating buildings: heat and mass transfer techniques and alternatives

AUTHOR AFFILIATION- Kernforschungsanlage, Julich GmbH, Germany

LOCATION OF WORK- DE

LITERARY INDICATOR(S)- Conference; Numerical Data

REPORT NUMBER(S)- CONF-770818--P2

SUBFILE CODE- TIC

PUBLISHER- Hemisphere Publishing Corp.

PUBLICATION PLACE- Washington, DC

PUBLICATION COUNTRY- US

CONFERENCE DATE- 29 Aug - 3 Sep 1977

CONFERENCE TITLE- Conference on heat and mass transfer in buildings

CONFERENCE LOCATION- Dubrovnik, Yugoslavia

ANNOUNCEMENT CODE- EDB; ERA;

ANNOUNCEMENT IDENTIFICATION- ERA-05:004540; EDB-80:001148

Stratified hot water storage offer the advantage that most of the stored heat can be extracted close to the loading temperature. In storage of this kind during load changing processes, a transition layer is built up which acts as a transient insulation barrier between hot and cold water. The development of this transition layer can be calculated assuming heat transfer by thermal conductivity only. But in reality the heat transfer through this transition layer will be also influenced by flow conditions of the load changing devices and natural convection. Therefore experiments were performed to investigate the real behavior of such storage. An existing well insulated square container (4.4 m x 4.7 m x 2 m high) was used. Comparisons between analytical and experimental results - so far available - indicate a good consistency only if a higher than the molecular thermal conductivity of water is assumed in the calculations. This effect seems to be due to increased heat transfer by natural convection.

IDENTIFIER(S)- DATA; ENERGY STORAGE; HYDROGEN COMPOUNDS; INFORMATION;

NUMERICAL DATA; OXYGEN COMPOUNDS; STORAGE; SURFACE WATERS  
SECTIONAL CLASSIFICATION CODE- 250600

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Citations from Energy Science and Technology (DOE): ED2

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**12. Theoretical and experimental determination of the temperature distribution in stratified warm water reservoirs**

EDB 79-05 79:025329 7811692214 NDN- 130-0046-7366-0

Leyers, H. J.; Scnoiz, F.; Thoien, A.

1977

27-32 page(s)

**DOCUMENT TYPE-** Book Analytic

**MONOGRAPH TITLE-** Rationelle Energienutzung durch Waerme-Speicherung

**LOCATION OF WORK-** DE

**LITERARY INDICATOR(S)-** Conference

**SUBFILE CODE-** DE

**PUBLISHER-** VDI

**PUBLICATION PLACE-** Duesseldorf, Germany, F.R.

**PUBLICATION COUNTRY-** DE

**CONFERENCE DATE-** 10 - 11 Oct 1977

**CONFERENCE TITLE-** Meeting on efficient energy utilization through heat storage

**CONFERENCE LOCATION-** Stuttgart, Germany, F.R.

**ANNOUNCEMENT CODE-** EDB; ERA

**ANNOUNCEMENT IDENTIFICATION-** ERA-04:016289; EDB-79:025329

**LANGUAGE-** German

It has been shown experimentally that in reservoirs, even with slow charging processes and large horizontal crossections, the reservoir forms temperature strata, which remain stable. Further, it has been shown that calculations of whole operating cycles alternating between charging, stable periods and discharging are possible by the given model representation with sufficient accuracy, as long as convection processes in the reservoir are taken into account by the introduction of effective thermal conductivity coefficients.

**IDENTIFIER(S)-** ENERGY STORAGE; EQUIPMENT; HEAT STORAGE; PHYSICAL PROPERTIES; STORAGE; SURFACE WATERS; THERMODYNAMIC PROPERTIES  
**SECTIONAL CLASSIFICATION CODE-** 250600

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Citations from ENGINEERING INDEX: EIX

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**13. Evaluation of in-situ measurements of water temperature , specific conductance , and pH in low ionic strength streams**

EIX 98-35 EIX98354276509 NDN- 017-0301-8294-7

Ranalli, Anthony J.

Water, Air and Soil Pollution v 104 n 3-4 Jun 1998. p 423-441  
1998

**DOCUMENT TYPE-** JA, Journal Article

**ISSN-** 0049-6979

**CODEN-** WAPLAC

**AUTHOR AFFILIATION-** Denver Federal Cent, Denver, CO, USA

**JOURNAL NAME-** Water, Air and Soil Pollution

**LANGUAGE-** English

The performance of minimonitors used by the U.S. Geological Survey for continuous measurement of water temperature, specific conductance, and pH in four low ionic strength streams in the Catskill Mountains of New York was evaluated through a calculation of their bias, precision, and accuracy and by comparison with laboratory measurements of specific conductance and pH on samples collected concurrently. Results indicate that the mini-monitor measurements of specific conductance and pH in an acidic stream (acid-neutralizing capacity always less than 0) agreed with laboratory measurements well enough that the minimonitors can be used to supplement laboratory measurements (mean difference in pH was 0.02 pH unit and mean difference in specific conductance was 0.72 mu S cm<sup>-1</sup> minus SUP1. This mean difference was 0.32 mu S cm<sup>-1</sup> minus SUP1 if the minimonitor data were adjusted by the bias). In less acidic streams (two streams in which the acid-neutralizing capacity was always greater than 0 and one in which the acid-neutralizing capacity was greater than 0 except during high flows), there was poor agreement between laboratory and minimonitor measurements of specific conductance at high flows and pH at all flows. The water-temperature probes measured with sufficiently small bias ( minus 0.1 degree C) and adequate precision ( plus or minus 0.70 degree C) for use with most applications. (Author abstract)  
15 Refs.

**DESCRIPTOR(S)-** pH; Monitoring; Probes; Temperature

**IDENTIFIER(S)-** In situ measurements; Specific conductance; Water temperature

**TREATMENT CODE-** TC-G (General Review)

**SECTIONAL CLASSIFICATION CODE-** CAL445.2; CAL801; CAL641.1; CAL801.1; CAL944

**SECTION HEADING-** Water analysis

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**14. Soil water movement in response to temperature gradients. Experimental measurements and model evaluation.**

EIX 92-07 EIX92070088802 NDN- 017-0170-7805-6

Bach, L. B.

Soil Sci Soc Am J v 56 n 1 Jan-Feb 1992 p 37-46  
1992

**DOCUMENT TYPE-** JA, Journal Article

**ISSN-** 0361-5995

**CODEN-** SSSJD4

**AUTHOR AFFILIATION-** USDA, Tucson, AZ, USA

**MONTHLY PUBLICATION NO.-** 094479**JOURNAL NAME-** Soil Science Society of America Journal**LANGUAGE-** English

Temperature gradients may have a significant effect on soil water movement under certain conditions, but inclusion of these effects adds complexity to the flow analysis. This study was conducted to help clarify the significance of nonisothermal water flow, and to examine theoretical and numerical descriptions of the transport processes. At initial water contents of 0.00, 0.049, 0.099, 0.151, and 0.282 mSUP3 mSUP minus SUP3, isothermal and nonisothermal laboratory experiments were conducted to provide direct information on soil water movement in response to temperature gradients. These data were used to evaluate the numerical simulation model SPLaSHWaTr2, and to examine calcualtion of the thermal conductivity, lambda ( theta ), the thermal vapor diffusivity, DSUBTSUBv( theta ), and the temperature coefficient of the matric potential, CSUB Psi , based on modifications to a theory proposed by Philip and de Vries in 1957. A statistically significant effect of the temperature gradient was found at an initial water content of 0.151 mSUP3 mSUP minus SUP3, which corresponds to a pressure head of approximately minus 1.2 m of HSUB2O. No effect of the temperature gradient was found at initial water contents of 0.00, 0.049, 0.099, or 0.282 mSUP3 mSUP minus SUP3. Under isothermal conditions, the model provided simulated water-content profiles that were in good agreement with measured profiles. Under nonisothermal conditions, profiles simulated by the model were in poor agreement with the measured data, using the original values of lambda ( theta ), DSUBTSUBv( theta ), and CSUB Psi . Sensitivity analysis showed that lambda ( theta ) and DSUBTSUBv( theta ) had a negligible influence on nonisothermal water movement. On the other hand, CSUB Psi had a significant influence on nonisothermal water movement. Adjusting CSUB phi from the original value of minus 0.0068 KSUP minus SUP1 to the value suggested by Philip and de Vries, minus 0.00209 KSUP minus SUP3, improved the agreement between simulated and measured water-content profiles, particularly at an initial water content of 0.282 mSUP3 mSUP minus SUP3. With the adjustment in CSUB Psi , the model simulations were in good agreement with the measured data, indicating that the Philip and de Vries theory provides an adequate description of the nonisothermal transport processes. (Author abstract) 37 Refs.

**DESCRIPTOR(S) -** COMPUTER SIMULATION; FLOW OF WATER; TEMPERATURE DISTRIBUTION; WATER

**IDENTIFIER(S) -** MODEL SIMULATION; SENSITIVITY ANALYSIS; SOIL WATER; TEMPERATURE GRADIENTS; WATER MOVEMENT

**TREATMENT CODE- TC-X (Experimental)**

**SECTIONAL CLASSIFICATION CODE- CAL483; CAL444; CAL631; CAL944**

**SECTION HEADING- SOILS --Moisture**

**15. Continuous measurement of effective thermal conductivity of well cuttings. Water mixture at geothermal conditions by hot-wire method under transient temperature field.**

EIX 91-12 EIX91120147344 NDN- 017-0160-8002-0

Kiyohashi, H.; Watanabe, T.; Kyo, M.

Exp Heat Transfer v 4 n 4 Jul 1991 p 432-440

1991

**DOCUMENT TYPE- JA, Journal Article**

**ISSN- 0894-1777**

**CODEN-** EXHTEV**AUTHOR AFFILIATION-** Tohoku Univ, Sendai, Jpn**MONTHLY PUBLICATION NO.-** 151850**JOURNAL NAME-** Experimental Heat Transfer**LANGUAGE-** English

A new continuous technique has been developed for the rapid measurement of the effective thermal conductivity of cuttings-water mixture beds at simulated in situ geothermal conditions to estimate the thermal conductivity of rocks in situ. The technique is based on a modified transient hot-wire method. Beds of mixtures of pure fused quartz grains and water were used as reference samples. Measurements were made at a sample heating rate of 20 degree C/h from room temperature to 110 degree C for the reference and to 200 degree C for the cuttings, and at natural cooling conditions from their maximum temperatures to room temperature. Higher accurate data were obtained with natural cooling than with forced heating. Thermal conductivity of the fused quartz grains estimated from the Kunii-Smith formula and the measured effective thermal conductivity of the sample agreed with literature data within the sum of experimental and estimating errors, plus or minus 15..%. Data obtained with cuttings from the Satsunan geothermal field, Kyushu, Japan are discussed. (Author abstract) 17 Refs.

**DESCRIPTOR(S)-** ROCK --Thermal Conductivity; TEMPERATURE DISTRIBUTION; THERMAL**CONDUCTIVITY**--Measurements**IDENTIFIER(S)-** CUTTINGS-WATER MIXTURE BEDS; HOT-WIRE METHOD; KUNII-SMITH**FORMULA; WELL CUTTINGS EFFECTIVE THERMAL CONDUCTIVITY****TREATMENT CODE-** TC-X (Experimental)**SECTIONAL CLASSIFICATION CODE-** CAL481; CAL615; CAL641; CAL944; CAL483; CAL921**SECTION HEADING-** GEOTHERMAL WELLS

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 Citations from Engineering Index (1983-1989): EI1
 

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16. STRUCTURAL MATERIAL ANOMALY DETECTION SYSTEM USING WATER  
 CHEMISTRY DATA, (III). IN-LINE MONITORS FOR ELECTRICAL CONDUCTIVITY OF  
 HIGH TEMPERATURE WATER.

EIX 88-01 EIX88010003596 NDN- 163-0220-3103-9

Asakura, Yamato; Uchida, Shunsuke

J Nucl Sci Technol v 24 n 8 Aug 1987 p 632-638

1987

**DOCUMENT TYPE-** JA, Journal Article

ISSN- 0022-3131

**CODEN-** JNSTAX**AUTHOR AFFILIATION-** Hitachi Ltd, Hitachi, Jpn**PATENT REFERENCE(S)-** Journal of Nuclear Science and Technology**PATENT STATUS INFO-** 009576**LANGUAGE-** English

A method to determine the electric conductivity of water continuously and directly at elevated temperature up to 300 degree C was developed which can be applied as a sensor for corrosion behavior foreknowledge and diagnosis systems using water chemistry data of BWR primary coolant. Complex impedance was measured between a couple of parallel platinum electrodes installed with a constant distance and dipped in the water. By analyzing frequency dependence of the impedance, the resistivity of the water between the platinum electrodes was estimated separately from the impedance caused by surface reactions on the platinum electrodes, which was the source of error in the measurement of electrical conductivity at elevated temperatures. (Edited author abstract) 15 refs.

**descriptor(s)** - ELECTRIC MEASUREMENTS --Conductivity; NUCLEAR REACTORS, BOILING WATER --Cooling Systems

**identifier(s)** - BWR; IMPEDANCE ANALYSIS; IN LINE MONITORS; RESISTIVITY; WATER CHEMISTRY

**treatment code** - TC-A (Applications), TC-T (Theoretical); TC-X (Experimental)

**sectional classification code** - CAL444; CAL701

**section heading** - WATER --Electric Conductivity

---

**17. DIELECTRIC BEHAVIOR OF ADSORBED WATER . 3. MEASUREMENT AT ROOM TEMPERATURE ON ZnO.**

EIX 87-06 EIX87060090772 NDN- 163-0208-4767-0

Iwaki, Tohru; Morimoto, Tetsuo

Langmuir v 3 n 2 Mar-Apr 1987 p 282-287

1987

**document type** - JA, Journal Article

ISSN- 0743-7463

CODEN- LANGD5

**author affiliation** - Hiroshima Univ, Hiroshima, Jpn

**patent reference(s)** - Langmuir

**foreign document reference(s)** - 126006

**patent status info** - 064682

**language** - English

The dielectric behavior in the ZnO-HSUB2O adsorption system was investigated at frequencies from 0. 1 Hz to 5 MHz and at room temperature. A large dielectric dispersion was found to appear in the low-frequency region from 0. 1 to 10<sup>4</sup> Hz and assigned to the interfacial polarization, as in the case of the TiOSUB2-HSUB2O system. However, an anomaly was observed in both isotherms of dielectric permittivity and electric conductance: a maximum and a minimum appear in both isotherms near the relative pressures of 0. 02 and 0. 2, respectively, the latter corresponding to the relative pressure at which the two-dimensional condensation of HSUB2O takes place. A mechanism is postulated to account for this anomaly. (Author abstract) 31 refs.

**descriptor(s)** - DIELECTRIC PROPERTIES; ELECTRIC CONDUCTIVITY ; ZINC COMPOUNDS

**identifier(s)** - ACTIVATION ENERGY; DIELECTRIC PERMITTIVITY; DIELECTRIC RELAXATION; INTERFACIAL POLARIZATION; ZINC OXIDE

**TREATMENT CODE- TC-X (Experimental)**  
**SECTIONAL CLASSIFICATION CODE- CAL444; CAL802; CAL701; CAL804**  
**SECTION HEADING- WATER --Adsorption**

---

**18. THERMAL CONDUCTIVITY MEASUREMENT OF HEAVY WATER OVER A WIDE RANGE OF TEMPERATURE AND PRESSURE.**  
**EIX 86-08 EIX86080117105 NDN- 163-0190-4257-5**

Tufeu, Roland; Bury, Pierre; Le Neindre, Bernard

J Chem Eng Data v 31 n 2 Apr 1986 p 246 249

1986

**DOCUMENT TYPE- JA, Journal Article**

**ISSN- 0021-9568**

**CODEN- JCEAAX**

**AUTHOR AFFILIATION- CNRS, Villetteuse, Fr**

**PATENT REFERENCE(S)- Journal of Chemical and Engineering Data**

**FOREIGN DOCUMENT REFERENCE(S)- 032530**

**PATENT STATUS INFO- 070264**

**LANGUAGE- English**

New measurements of thermal conductivity coefficients of heavy water have been performed in the temperature range from 210 to 510 degree C and in the pressure range from 1 to 100 MPa corresponding to a density range from 3 to 700 kg/m<sup>3</sup>. Most of the measurements were performed in the supercritical region where the typical enhancement of the thermal conductivity is observed. The experimental values are compared with a recommended correlation. (Author abstract) 13 refs.

**DESCRIPTOR(S)- THERMAL CONDUCTIVITY --Measurements**

**IDENTIFIER(S)- DENSITY RANGE; HEAVY WATER**

**TREATMENT CODE- TC-X (Experimental)**

**SECTIONAL CLASSIFICATION CODE- CAL804; CAL641**

**SECTION HEADING- DEUTERIUM --Thermal Conductivity**

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**19. Continuous Detection of Physico-Chemical Parameters of Water ( Temperature , Conductivity ) Sodium in Karstic Sources in Swiss Jura. Technology of Hydrologic Measurements and Interpretations.**  
**EIX 85-08 EIX85080113086 NDN- 163-0170-4259-6**

Muller, I.; Wacker, C.; Wittwer, C.

Commissie voor Hydrologisch Onderzoek TNO, Verslagen en Mededelingen n 31. Publ by TNO, The Hague, Neth p 279-288

1983

**DOCUMENT TYPE- CA, Conference Paper**

**MONOGRAPH TITLE**- Commissie voor Hydrologisch Onderzoek TNO, Verslagen en Mededelingen

**ISSN**- 0548-1228

**ISBN**- 90-6743-020-X

**CODEN**- CHOVA2

**AUTHOR AFFILIATION**- Cent d'hydrogeologie, Neuchatel, Switz

**SPONSOR**- TNO, The Hague, Neth; UNESCO, Paris, Fr; Netherlands Natl Committee for the Int Hydrological Programme, Neth; Int Assoc of Hydrological Sciences, Wallingford, Engl; Int Assoc of Hydrogeologists, Arnhem, Neth

**CONFERENCE DATE**- 19830500

**CONFERENCE TITLE**- Methods and Instrumentation for the Investigation of Groundwater Systems, TNO International Symposium.

**CONFERENCE LOCATION**- Noordwijkerhout, Neth

**LANGUAGE**- French

For many years, the continuous detection of the temperature ( plus or minus 0. 1 degree C), the electric conductivity ( plus or minus 3 mu S/cm) and the activity of the sodium ion ( plus or minus 0. 1 mg/10) has been carried out by means of adapted sensors at the outlet of four karstic basins in the Swiss Jura. In comparison with the hydrography of springs, the fluctuations of these parameters allow them to be considered as natural tracers and indicators of the different components of karstic water-bearing rocks discharge. Important results obtained by these studies increase knowledge about: the rising mechanism of the karstic spring, the transfer speed in the very permeable karst-net (fracture permeability), the rapid dry up of surface infiltration, and the feeding of the outlet from the low permeability 'blocks' (primary permeability). Certain artificial tracers and anthropogenous pollutions are displayed with the help of adapted ion-selective electrodes. 6 refs. In French with English abstract.

**DESCRIPTOR(S)**- GEOLOGY --Physical Chemistry; IONS --Measurements

**IDENTIFIER(S)**- KARST NETS; KARSTIC SPRINGS

**SECTIONAL CLASSIFICATION CODE**- CAL444; CAL471; CAL481; CAL801; CAL931; CAL701

**SECTION HEADING**- HYDROLOGY --Measurements

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Citations from INSPEC: IN1

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**20. Measurement of water flow velocity by analysis of short temperature steps**

INS 96-50 5454054 A9703-4780-023 (PHA); B NDN- 083-0545-4053-4

Sonnenschmidt, D.; Vanselow, K. H.

**JOURNAL NAME**- Measurement Science & Technology

**ABBREVIATED JOURNAL TITLE**- Meas. Sci. Technol. (UK)

**VOL.** 7

**NO.** 10

Oct. 1996

**PP.** 1536-9

10 reference(s)

**DOCUMENT TYPE**- Journal paper

**ISSN**- 0957-0233

**CODEN**- MSTCEP

**CORPORATE AUTHOR**- Forschungs- und Technologiezentrum Westküste, Kiel Univ., Germany

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**COPYRIGHT CLEARANCE CENTER CODE**- 0957-0233/96/101536+04\$19.50

**PUBLISHER**- IOP Publishing

**PUBLICATION COUNTRY**- UK

**S I C I**- 0957-0233(199610)7:10L:1536:MWFV;1-F

**LANGUAGE**- English (DEF)

A new temperature-step method is used to measure flow velocity and phase transitions between sediment, water and air. The computer-driven measuring system characterizes the temperature response to a heat-on step by adequate parameters. This is implemented by means of computer-controlled heat pulses in one wire of a double PT100 sensor, which creates a temperature rise in the ambient sensor medium. The induced temperature rise is simultaneously measured by a second wire in the same sensor. This rise is correlated to the temperature conductivity and the flow velocity of the surrounding medium. The characterization can best be given by fitting the temperature-step answer with exponential functions. The short temperature pulse (0.1-1 s) results in only a little heating of the surrounding medium. This offers the possibility to measure very low flow velocities, without sensor-induced heat convection. The low energy consumption qualifies the system for stand-alone operation.

**DESCRIPTOR(S)** - anemometry; computerised instrumentation; curve fitting; data acquisition; flow measurement; geophysics computing; physics computing; temperature distribution; temperature sensors; water

**IDENTIFIER(S)** - computer-controlled data acquisition; computer-controlled heat pulses; computer-driven measuring system; data-dependent curve-fitting analysis; double PT100 sensor wire; exponential functions; induced temperature rise; low energy consumption; phase transitions; sediment; short temperature steps analysis; stand-alone operation; temperature response; temperature-step method; tidal flats; very low flow velocities; water flow velocity measurement; 0.1 to 1 s

**NUMERICAL DATA INDEXING**- time 1.0E-01 to 1.0E+00 s

**TREATMENT CODE**- TC-P; TC-X

**SECTIONAL CLASSIFICATION CODE** - A4780; A0630G; A9365; A9385; A0260; A0650D;

A0720D; B7320W; B7320E; B7710D; B7210B; B0290F; B7210G; B7230; B7320R; C7320; C5520;

C7340; C4130; C7410H

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21. Structural material anomaly detection system using water chemistry data. (VI). Application of high temperature electrical conductivity monitor in advanced water chemistry diagnosis  
INS 91-03 3793367 A91014986 (PHA) NDN- 083-0379-3367-7

Asakura, Y.; Nagase, M.; Kondou, M.; Uchida, S.; Ohsumi, K.

**JOURNAL NAME**- Journal of Nuclear Science and Technology

**ABBREVIATED JOURNAL TITLE**- J. Nucl. Sci. Technol. (Japan)

**VOL**. 27

**NO**. 9

Sept. 1990

**PP.** 815-26

14 reference(s)

**DOCUMENT TYPE-** Journal paper**ISSN-** 0022-3131**CODEN-** JNSTAX**CORPORATE AUTHOR-** Energy Res. Lab., Hitachi Ltd., Japan**PUBLICATION COUNTRY-** Japan**LANGUAGE-** English (DEF)

The developed high temperature electrical conductivity monitor is applied to the following three items: (1) Determination of the dissociation constant of an aqueous impurity at elevated temperature up to 300 degrees C; (2) on-line chemical analysis of an aqueous impurity by using the known, significant difference in temperature dependence of electrical conductivity for different chemical forms; (3) more reliable prediction of the effects of an aqueous impurity on the corrosion rate at elevated temperatures by using the conductivity at the corroding temperature instead of the one at room temperature. Obtained results suggest that high temperature conductivity monitoring is effective for implementing an advanced in-service anomaly detection system, using water chemistry data, in nuclear power plants.

**DESCRIPTOR(S)-** electrical conductivity measurement; fission reactor materials**IDENTIFIER(S)-** aqueous impurity; corroding temperature; corrosion rate; dissociation constant; high temperature electrical conductivity monitor; in-service anomaly detection system; nuclear power plants; on-line chemical analysis; structural material anomaly detection system; water chemistry data; 300 degC**NUMERICAL DATA INDEXING-** temperature 5.73E+02 K**TREATMENT CODE-** TC-A; TC-P**SECTIONAL CLASSIFICATION CODE-** A2842Q; A0750

Citations from INSPEC (80-89): IN2

**22. Dielectric behaviour of adsorbed water . I. Measurement at room temperature on TiO<sub>2</sub>/**  
**INS 87-03 2929134 A87092584 (PHA) NDN- 161-0292-9134-3**

Morimoto, T.; Iwaki, T.

**JOURNAL NAME-** Journal of the Chemical Society Faraday Transactions I**ABBREVIATED JOURNAL TITLE-** J. Chem. Soc. Faraday Trans. I (UK)**pt.4****VOL.** 83

April 1987

**PP.** 943-56

43 reference(s)

**DOCUMENT TYPE-** Journal paper**ISSN-** 0300-9599**CODEN-** JCFTAR**CORPORATE AUTHOR-** Dept. of Chem., Okayama Univ., Japan**PUBLICATION COUNTRY-** UK

**LANGUAGE-** English (DEF)

The dielectric behaviour in the  $\text{TiO}_{2}/\text{H}_{2}/\text{O}$  adsorption system has been investigated at frequencies from 0.1 MHz to 5 Hz at room temperature. A large dielectric dispersion has been found from 0.1 to  $10^{4}$  Hz, which shifts to a higher frequency region when the coverage of physisorbed  $\text{H}_{2}/\text{O}$  increases. A simultaneous increase in **conductance** has been observed when the coverage increases. Thus, the dielectric relaxation observed at room temperature has been interpreted in terms of the interfacial polarization, which obeys the two-layer model and increases with increasing **conductance**. A mechanism is postulated for an enhancement of the **conductance** which takes place when  $\text{H}_{2}/\text{O}$  is adsorbed on  $\text{TiO}_{2}$ .

**DESCRIPTOR(S)**- adsorbed layers; dielectric relaxation; titanium compounds; water

**IDENTIFIER(S)** - adsorption; **conductance**; dielectric behaviour; dielectric dispersion; dielectric relaxation; interfacial polarization; two layer model;  $\text{H}_{2}/\text{O}$ ;  $\text{TiO}_{2}/\text{H}_{2}/\text{O}$ ; 0.1 Hz to 5 MHz

**NUMERICAL DATA INDEXING**- frequency 1.0E-01 to 5.0E+06 Hz

**CHEMICAL INDEXING** -  $\text{TiO}_{2}/\text{O}$ ;  $\text{TiO}_{2}/\text{H}_{2}/\text{O}$ ;  $\text{O}/\text{H}$ ;  $\text{H}_{2}/\text{O}$ ;  $\text{O}/\text{H}$ ;  $\text{H}/\text{O}$

**TREATMENT CODE**- TC-X

**SECTIONAL CLASSIFICATION CODE**- A6845D; A7740

**23. Water temperature measurements in turbulent streams during periods of frazil-ice formation**  
**INS** 84-00 2185723 **NDN**- 161-0218-5723-4

Osterkamp, T. E.; Gilfilian, R. E.; Gosink, J. P.; Benson, C. S.

**JOURNAL NAME**- Annals of Glaciology

**ABBREVIATED JOURNAL TITLE**- Ann. Glaciol. (UK)

**VOL.** 4

1983

**PP.** 209-15

20 reference(s)

**DOCUMENT TYPE**- Journal paper

**ISSN**- 0260-3055

**CODEN**- ANGLDN

**CORPORATE AUTHOR**- Geophys. Inst., Univ. of Alaska, Fairbanks, AK, USA

**PUBLICATION COUNTRY**- UK

**LANGUAGE**- English (DEF)

Field measurements of water temperatures in two turbulent streams of interior Alaska have been made during periods of frazil-ice production. The measured equilibrium temperature of the water  $\text{T}_{\text{e}}$  approximately  $-0.005$  degrees C agrees with the value calculated from the electrical conductivity of the water. Average cooling rates of the streams during the summer-to-fall stream cooling period were on the order of several tenths of a degree per day with average surface heat losses of  $-5$  to  $-18 \text{ W m}^{-2}$ . Just prior to a frazil-ice event, the water-cooling rates were  $-1$  to  $-3 \text{ mK min}^{-1}$  with surface heat losses of  $-47$  to  $-140 \text{ W m}^{-2}$ . Supercooling at the water surface of a stream prior to and during frazil-ice production does not exceed 0.02 degrees C. Water supercooling at the time of frazil-ice nucleation was

<10 mK. These measurements show that frazil-ice nuclei in streams must be other ice particles, cold organic materials, cold soil particles, or a combination of these, that may be introduced in the stream by mass exchange processes at the air-water interface. The maximum observed supercooling was Delta T/sub m/ approximately=40 mK.

**descriptor(s)**- ice; rivers

**Identifier(s)** - cooling rates; frazil-ice formation; nucleation; river; supercooling; supercooling; surface heat losses; turbulent stream; water temperature; Alaska; United States; USA

**Treatment Code**- TC-X

**Sectional Classification Code**- A9240F; A9240S; A9330H

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Citations from U.S. Patent Bibliographic Database: PAT

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**24. Method of determination of active ions by electric conductivity and electric conductivity metering system therefor**  
PAT 03-07-00 06034520 NDN- 175-0362-0895-0

**INVENTOR(S)**- Sugihara, Toshio; Suzuki, Mitsuo; Komiya, Marcos Masaki

**PATENT NUMBER**- 06034520

**PATENT APPLICATION NUMBER**- 845357

**DATE FILED**- 1997-04-24

**PATENT DATE**- 2000-03-07

**NUMBER OF CLAIMS**- 9

**EXEMPLARY CLAIMS**- 7

**FIGURES**- 2

**ART/GROUP UNIT**- 223

**PATENT CLASS**- Invention (utility) patent

**INVENTOR COUNTRY/ZIPCODE**- JPX; JPX; JPX

**PATENT ASSIGNEE(S)**- Life Energy Industry Inc.

**ASSIGNEE COUNTRY**- JPX

**ATTORNEY, AGENT, OR FIRM**- Wenderoth, Lind & Ponack, L.L.P.

**U.S. PATENT CLASS**- 3240711000

**U.S. CLASSIFICATION REFS.**- X324439000; X324441000; X324450000; X324717000

**U.S. CLASSIFICATION CLASS**- 7G01N02706

**INTERNATIONAL PATENT CLASS**- 4871427; 5218312; 5289132; 5517181; 5521510

**PATENT REFERENCE(S)**- 4871427; 5218312; 5289132; 5517181; 5521510

Provided is a method and metering system for the determination of active ions emitted from certain active substances such as rayon fibers containing fine particles of tourmaline known to exhibit permanent

spontaneous polarization. The method comprises: continuously bringing air free from carbon dioxide as a carrier gas into contact with a bed of the active ion-emitting source material to carry off the active ions emitted therefrom; introducing the air after contact with the source material into distilled water; and measuring increase in the electric conductivity of the distilled water caused by the absorption of the active ions from the flow of the air as a carrier gas. The metering system comprises: a feed source of the non-ionic inert gas; a sample holder to contain the source material emitting active ions; a vessel containing distilled water to receive the air carrying the active ions; a means to determine the electric conductivity of the water; and pipelines connecting these parts for the flow of air.

**EXEMPLARY CLAIMS** - Claim- 7. A metering system for the determination of active ions which comprises: (A) a feed source of a non-ionic inert gas; (B) an elongated vertically installed cylindrical vessel as a sample holder equipped with a temperature detector and a heater and having an inlet port for a non-ionic inert gas at one end and an outlet port for the gas at the other end opposite to the inlet port, which holds a source material emitting active ions contained therein; (C) a vessel containing distilled water having a thermostat, (D) a first pipeline connecting the inlet port of the elongated vessel (B) to the feed source of the non-ionic inert gas (A); (E) a second pipeline connecting the outlet port of the elongated vessel (B) to the vessel (C) containing distilled water and the outlet of said second pipeline proximate to the surface of the distilled water; and (F) an instrument comprising electrodes for the determination of the electric conductivity of the distilled water contained in the vessel (C) with said electrodes being kept in the distilled water.

NO-DESCRIPTORS .

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25. Electromagnetic field perturbation sensor and methods for measuring water content in sheetmaking systems  
 PAT 09-21-99 05954923 NDN- 175-0345-1947-2

**INVENTOR(S)**- Chase, Lee; Goss, John; Walford, Graham V.

**PATENT NUMBER**- 05954923

**PATENT APPLICATION NUMBER**- 083753

**DATE FILED**- 1998-05-26

**PATENT DATE**- 1999-09-21

**NUMBER OF CLAIMS**- 22

**EXEMPLARY CLAIMS**- 1

**FIGURES**- 11

**ART/GROUP UNIT**- 171

**PATENT CLASS**- Invention (utility) patent

**PATENT ASSIGNEE(S)**- Honeywell-Measurex Corporation

**ASSIGNEE CITY**- Cupertino

**ASSIGNEE STATE**- CA

**ATTORNEY, AGENT, OR FIRM**- Burns, Doane, Swecker & Mathis LLP

**U.S. PATENT CLASS**- 162263000

**U.S. CLASSIFICATION REFS.** - X162258000; X162259000; X162DIG006; X162DIG0011;

X364471020

**INTERNATIONAL PATENT CLASS**- 6D21F00106; D21F00108; D21F00706

**PATENT REFERENCE(S)**- 4845421

An apparatus for sensing three properties of materials: the conductivity or resistance, the dielectric constant, and the proximity of the material to the sensor portion of the apparatus. The apparatus includes a fixed impedance element coupled in series with the sensor portion of the apparatus between an input signal and ground. The sensor portion of the apparatus is an electrode configuration which includes at least two electrodes with a portion of the material residing between and in close proximity to the electrodes. The sensor exhibits a variable impedance resulting from changes in physical characteristics of the material. The fixed impedance element and the variable impedance of the sensor portion form a voltage divider network such that changes in impedance of the sensor portion results in changes in voltage on the output of the apparatus. The variable impedance of the sensor portion relates to changes in property of the material being sensed which can then be related to changes in other physical characteristics of the material such as weight, chemical composition, and temperature.

**EXEMPLARY CLAIMS-** Claim- 1. A papermaking apparatus having a means for detecting fluctuations in resistive impedance of a wetstock material, said apparatus comprising: an impedance element; a sensor including a first electrode and a second electrode which is spaced-apart and adjacent to said first electrode, a portion of a web of said material being between and in close proximity to said first and said second electrodes, said sensor having an associated variable impedance and being coupled in series with said impedance element between an input signal and a reference potential; a means for providing a feedback signal to adjust said input signal such that said fluctuations in said resistive impedance are due to fluctuations in one of material weight, chemical composition, and **temperature**; wherein said fluctuations in said resistive impedance of said portion of material causes variations in said sensor impedance and changes in voltage measured across said sensor.

NO-DESCRIPTORS .

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**26. Apparatus for the measurement of dissolved carbon in deionized water**  
 PAT 08-25-98 05798271 NDN- 175-0313-2327-0

**INVENTOR(S)-** Godec, Richard D.; O'Neill, Kevin J.; Kosenka, Paul K.

**PATENT NUMBER-** 05798271

**PATENT APPLICATION NUMBER-** 629033

**DATE FILED-** 1996-04-08

**PATENT DATE-** 1998-08-25

**NUMBER OF CLAIMS-** 53

**EXEMPLARY CLAIMS-** 1

**FIGURES-** 10

**ART/GROUP UNIT-** 133

**PATENT CLASS-** Invention (utility) patent

**PATENT ASSIGNEE(S)-** Sievers Instruments, Inc.

**ASSIGNEE CITY-** Boulder

**ASSIGNEE STATE-** CO

**ATTORNEY, AGENT, OR FIRM-** Lappin & Kusmer, LLP

**U.S. PATENT CLASS-** 4361460000

**U.S. CLASSIFICATION REFS. -** X436145000; X436150000; X436155000; X436158000;

X422078000; X422080000; X422082020; X422090000; X422093000

**INTERNATIONAL PATENT CLASS-** 6G01N02518

**PATENT REFERENCE(S) -** 3224837; 3958941; 4209299; 4273558; 4277438; 4288229; 4293522;

4352673; 4504373; 4519983; 4529495; 4619902; 4626413; 4666860; 4749657; 4775634; 4868127;  
5047212; 5132094; 5141717; 5312756; 5443991

**PATENT REFERENCED BY- 05994146**

Apparatus and methods for the measurement of total organic carbon, total inorganic carbon, total carbon and total heteroorganic carbon of deionized water are described. In a preferred embodiment, the sample is split into a first stream and a second stream. Inorganic carbon in the first stream is measured using a temperature and conductivity cell, and then the organic carbon in the first stream is oxidized in a U.V. oxidation module. The resulting carbon dioxide is transferred through a carbon dioxide permeable membrane into the second stream. The second stream then passes into a second temperature and conductivity cell for the measurement of total carbon.

**EXEMPLARY CLAIMS-** Claim- 1. An apparatus for measurement of carbon in a ~~water~~ sample stream, comprising: means for splitting the sample stream into a first set of conduits to contain a first sample stream and a second set of conduits to contain a second sample stream; a first ~~temperature~~ and conductivity cell in communication with the first set of conduits to measure the conductivity of the first sample stream, an oxidation reactor in communication with the first set of conduits to oxidize organic compounds in the first sample stream to carbon dioxide; a gas permeable membrane to divide the first sample stream from the second sample stream and to allow at least a portion of said carbon dioxide to permeate from the first sample stream to the second sample stream; and a second ~~temperature~~ and conductivity cell in communication with the second set of conduits to measure conductivity of the second sample stream, wherein output from at least one of said ~~temperature~~ and conductivity cells is used for said measurement of carbon.

**NO-DESCRIPTORS**

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Citations from U.S. Patent Bibliographic Database: PA1

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**27. Method for the determination of dissolved carbon in water**

PAT 08-22-95 05443991 NDN- 095-0218-4193-2

**INVENTOR(S)-** Godec, Richard D.; Kosenka, Paul K.; Huppe, Richard

**PATENT NUMBER-** 05443991

**PATENT APPLICATION NUMBER-** 869308

**DATE FILED-** 1992-04-16

**PATENT DATE-** 1995-08-22

**NUMBER OF CLAIMS-** 11

**EXEMPLARY CLAIMS-** 1

**FIGURES-** 15

**ART/GROUP UNIT-** 133

**PATENT CLASS-** Invention (utility) patent

**PATENT ASSIGNEE(S)-** Sievers Instruments, Inc.

**ASSIGNEE CITY-** Boulder

**ASSIGNEE STATE- CO**

**ATTORNEY, AGENT, OR FIRM-** Beaton & Folsom

**U.S. PATENT CLASS-** 436145000

**U.S. CLASSIFICATION REFS.-** X436147000

**INTERNATIONAL PATENT CLASS-** 6G01N03300

**PATENT REFERENCE(S) -** 3224837; 3459938; 3607071; 3854881; 3958941; 4209299; 4277438;

4288229; 4293522; 4504373; 4529495; 4619902; 4626413; 4666860; 4775634

**PATENT REFERENCED BY-** D0421653; 05932791; 05976468; 06007777

**PATENT REFERENCED BY-** D0421653; 05932791; 05976468; 06007777

**PATENT REFERENCED BY-** D0421653; 05932791; 05976468; 06007777

Apparatus and methods for the measurement of total organic carbon and total inorganic and organic content of water are described. A novel combination of an acidification module, and inorganic carbon removal module based on a carbon dioxide selective gas permeable membrane, and oxidation reaction system which incorporates in-situ generation of oxidizing agents, coupled with catalyzed photo-oxidation of organic compounds to form carbon dioxide, and a high sensitivity, conductometric detector employing a carbon dioxide selective gas permeable membrane permits on-line measurement of the total organic carbon content of water streams.

**EXEMPLARY CLAIMS-** Claim- 1. A process for the measurement of carbon compounds, comprising: acidifying an aqueous sample in a sample stream containing carbon dioxide, bicarbonate, carbonate and organic carbon, to convert bicarbonate and carbonate into carbon dioxide; removing the carbon dioxide from said sample stream in an inorganic carbon removal module; converting organic carbon in said sample stream into carbon dioxide in an oxidation reactor; and passing the sample stream containing carbon dioxide into carbon dioxide detection means including a carbon dioxide permeable membrane with two sides, having the sample stream on one side and deionized water on the other side, whereby carbon dioxide passes through the membrane from the sample stream to the deionized water to form water with carbon dioxide in solution; and measuring the conductivity and temperature of the dioxide concentration in the water with carbon dioxide in solution.

---

#### 28. Instrument and method for measurement of the organic carbon content of water

PAT 01-04-94 05275957 NDN- 095-0199-4800-7

**INVENTOR(S)-** Blades, Frederick K.; Melanson, Paul C.; Godec, Richard D.

**PATENT NUMBER-** 05275957

**PATENT APPLICATION NUMBER-** 757327

**DATE FILED-** 1991-09-10

**PATENT DATE-** 1994-01-04

**NUMBER OF CLAIMS-** 46

**EXEMPLARY CLAIMS-** 1

**FIGURES-** 23

**ART/GROUP UNIT-** 189

**PATENT CLASS-** Invention (utility) patent

**PATENT ASSIGNEE(S)-** Anatel Corporation

ASSIGNEE CITY- Boulder

ASSIGNEE STATE- CO

ATTORNEY, AGENT, OR FIRM- de Angeli, Michael

U.S. PATENT CLASS- 436133000

U.S. CLASSIFICATION REFS. - X422078000; X422082020; X422082120; X422186300;

U.S. CLASSIFICATION REFS. - X436146000; X436150000; X436159000; X436905000

INTERNATIONAL PATENT CLASS- 5G01N03112

DISCLAIMER- 20060919

PATENT REFERENCE(S)- 2019871; 3224837; 3287088; 3535087; 3607071; 3738812; 3854877; 3955924; 3958941; 3964868; 4140018; 4227151; 4248598; 4272679; 4288229; 4293522; 4304996; 4357668; 4418566; 4523331; 4566073; 4626413; 4666860; 4683435; 4749657; 4769217; 4868127; 5047212; 5141717

PATENT REFERENCED BY- 05677190; 05868924

FOREIGN DOCUMENT REFERENCE(S)- 3117537; 3223167; 2029015

FOREIGN COUNTRY CODE- DEX; DEX; GBX

Apparatus and methods for measurement of total organic carbon content of water, particularly of low relative organic content, are described, featuring a single sample cell for exposure of a static sample to ultraviolet radiation and comprising electrodes for measuring the conductivity of the water. The conductivity is monitored as a function of time and the second time derivative of the conductivity signal is monitored to indicate when the oxidation reaction has been completed. Compensation for the contribution to conductivity of the water sample made by the instrument is achieved by subtracting a quantity proportional to the first time derivative of the conductivity at a time when the second time derivative reaches zero, indicating that the oxidation reaction is complete, from the change in the total conductivity measurement, the remainder being equal to the contribution to conductivity made by oxidation of the organic content of the water. The electrodes may have surfaces of a material which when irradiated by the ultraviolet radiation catalyzes the oxidation reaction. Electrophoresis may also be employed to speed the reaction. In appropriate cases, the pH of the water sample is additionally measured and used together with the temperature of the sample to derive a series of values for the carbon dioxide content of the sample from the measured values of the conductivity. For further accuracy, the actual carbon dioxide content values may be employed in the analysis in lieu of the conductivity values.

EXEMPLARY CLAIMS- Claim- 1. A method for measuring total organic carbon content of a sample of deionized water, comprising the steps of: introducing said sample of water to a sample cell, said cell comprising a window formed of a material transparent to ultraviolet radiation, and a pair of electrodes; irradiating said sample of water and said electrodes with ultraviolet radiation to oxidize the total organic carbon content of the sample of water to carbon dioxide; repetitively measuring the conductivity and temperature of said sample of water in said sample cell; employing the results of said repetitive measurements of the temperature and conductivity of the sample of water to yield a series of values for the carbon dioxide content of the sample of water; and analyzing said series of values to determine the initial total organic carbon content of the sample of water.

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29. Method and apparatus for the determination of dissolved carbon in water  
PAT 07-21-92 05132094 NDN- 095-0183-5672-8

INVENTOR(S)- Godec, Richard D.; Kosenka, Paul K.; Huppe, Richard

**PATENT NUMBER-** 05132094

**PATENT APPLICATION NUMBER-** 487720

**DATE FILED-** 1990-03-02

**PATENT DATE-** 1992-07-21

**NUMBER OF CLAIMS-** 12

**EXEMPLARY CLAIMS-** 1

**FIGURES-** 15

**ART/GROUP UNIT-** 181

**PATENT CLASS-** Invention (utility) patent

**PATENT ASSIGNEE(S)-** Sievers Instruments, Inc.

**ASSIGNEE CITY-** Boulder

**ASSIGNEE STATE-** CO

**ATTORNEY, AGENT, OR FIRM-** Beaton & Swanson

**U.S. PATENT CLASS-** 4220681000

**U.S. CLASSIFICATION REFS.** - X422078000; X422079000; X422080000; X422082030;

X436145000; X436146000

**INTERNATIONAL PATENT CLASS-** 5G01N02700

**PATENT REFERENCE(S)-** 3958941; 4277438; 4288229; 4293522; 4529495; 4619902; 4666860

**PATENT REFERENCED BY -** D0421653; 05413763; 05459075; 05476637; 05531960; 05567388;

05643799; 05672516; 05750073; 05798271; 05861316; 05910448; 05932791; 05976468; 05994146;

06007777

**PATENT STATUS INFO-** 08/09/94, Certificate of Correction, (COR)

Apparatus and methods for the measurement of total organic carbon and total inorganic and organic content of water are described. A novel combination of an acidification module, and inorganic carbon removal module based on a carbon dioxide selective gas permeable membrane, and oxidation reaction system which incorporates in-situ generation of oxidizing agents, coupled with catalyzed photo-oxidation of organic compounds to form carbon dioxide; and a high sensitivity, conductometric detector employing a carbon dioxide selective gas permeable membrane permits on-line measurement of the total organic carbon content of water streams.

**EXEMPLARY CLAIMS-** Claim- 1. Apparatus for the measurement of the total organic carbon of an aqueous sample in a sample stream comprised of: (a) oxidation reactor means for the conversion of organic compounds of an aqueous sample in a sample stream to carbon dioxide, said oxidation reactor means having an inlet and an outlet; (b) carbon dioxide membrane means for the extraction of said carbon dioxide formed in said oxidation reactor means into a deionized water stream, said carbon dioxide membrane means comprised of first and second chambers separated by a membrane, wherein said first chamber is in fluid communication with the outlet of said oxidation reactor means; and (c) conductivity and temperature measurement cell means in fluid communication with said second chamber for measuring the total concentration of the ionic species in said deionized water stream and the temperature of the deionized water stream.

---

**30. Means and method for determining the conductance of a fluid**

PAT 04-21-92 05107219 NDN- 095-0180-8243-4

**INVENTOR(S)-** Marrelli, John D.; Pepin, Lisa L.; Hatton, Gregory J.; Siddiqui, Farhan; Stafford, Joseph

D.

**PATENT NUMBER-** 05107219

**PATENT APPLICATION NUMBER-** 637023

**DATE FILED-** 1991-01-03

**PATENT DATE-** 1992-04-21

**NUMBER OF CLAIMS-** 4

**EXEMPLARY CLAIMS-** 1

**FIGURES-** 5

**ART/GROUP UNIT-** 267

**PATENT CLASS-** Invention (utility) patent

**PATENT ASSIGNEE(S)-** Texaco Inc.

**ASSIGNEE CITY-** White Plains

**ASSIGNEE STATE-** NY

**ATTORNEY, AGENT, OR FIRM-** Kulason, Robert A.; O'Loughlin, James J.; Gillespie, Ronald G.

**U.S. PATENT CLASS-** 324640000

**U.S. CLASSIFICATION REFS.-** X324643000; X324698000

**INTERNATIONAL PATENT CLASS-** 5G01N02200; G01R02704

**PATENT REFERENCE(S)-** 4902961; 4947127; 4947128; 4947129; 4977377; 5001434; 5014010

**PATENT REFERENCED BY-** 05576974; 05644244; 05724990; 05793216; 05902255

The **conductance** meter includes source means which irradiates a fluid with microwave energy. A receiver receives microwave energy that has passed through the fluid and provides the received microwave energy as test microwave energy. Electronic apparatus determines the **conductance** of the fluid in accordance with the amplitude of the test microwave energy and the phase difference between the microwave energy from the source and the test microwave energy from the receiver where only 1 microwave frequency is used.

**EXEMPLARY CLAIMS-** Claim- 1. A **conductance** meter comprising: irradiation means for irradiating a fluid with microwave energy, **temperature** sensing means for sensing the **temperature** of the fluid and providing a **temperature** signal corresponding thereto, receiving means for receiving microwave energy that has passed through the fluid and providing the received microwave energy as test microwave energy, deriving means connected to the irradiation means, to the receiving means and to the **temperature** sensing means for deriving the **conductance** of the fluid in accordance with the **temperature** signal, an amplitude of the test microwave energy and a phase difference between the microwave energy from the irradiation means and the test microwave energy from the receiving means; and in which the deriving means includes: means for determining a constant ratio M sub T at a sensed **temperature**, of any **water** continuous mixture of oil/water in accordance with the following equation:  $M_{sub T} = (A_1 - A_0) / (P_1 - P_0)$ , where A0 and P0 are first amplitude and phase difference measurements of the fluid or where A1 and P1 are second amplitude and phase difference measurements of the fluid.

---

**31. Instrument for measurement of the organic carbon content of water**

PAT 00-00-91 05047212 NDN- 095-0170-5830-8

**INVENTOR(S)-** Blades, Frederick K.; Godec, Richard D.

**PATENT NUMBER-** 05047212

**PATENT APPLICATION NUMBER-** 270451

**DATE FILED-** 1988-11-07

**PATENT DATE-** 1991-09-10

**NUMBER OF CLAIMS-** 17

**EXEMPLARY CLAIMS-** 1

**FIGURES-** 20

**ART/GROUP UNIT-** 189

**PATENT CLASS-** Invention (utility) patent

**PATENT ASSIGNEE(S)-** Anatel Corporation

**ASSIGNEE CITY-** Boulder

**ASSIGNEE STATE-** CO

**ATTORNEY, AGENT, OR FIRM-** de Angeli, Michael

**U.S. PATENT CLASS-** 4220820200

**U.S. CLASSIFICATION REFS.** - X422078000; X422080000; X422082120; X422186300; X436146000

**INTERNATIONAL PATENT CLASS-** 5G01N03112

**DISCLAIMER-** 20060919

**PATENT REFERENCE(S)** - 2019871; 3224837; 3287088; 3535087; 3607071; 3738812; 3854877; 3955924; 3958941; 3964868; 4140018; 4227151; 4248598; 4272679; 4288229; 4293522; 4304996; 4357668; 4418566; 4523331; 4566077; 4683435; 4749657; 4868127

**PATENT REFERENCED BY** - 05272091; 05275957; 05302356; 05376335; 05395522; 05500371; 05677190; 05741709; 05798271; 05820823; 05902751

**FOREIGN DOCUMENT REFERENCE(S)**- 3223167; 2029015

**FOREIGN COUNTRY CODE-** DEX; GBX

Apparatus for measurement of total organic carbon content of water, particularly of low relative organic content, is described which features a single sample cell for exposure of a static sample to ultraviolet radiation comprising electrodes for measuring the conductivity of the water. The conductivity is monitored as a function of time and the second time derivative of the conductivity signal is monitored to indicate when the oxidation reaction has been completed. Compensation for the contribution to conductivity of the water sample made by the instrument is achieved by subtracting a quantity proportional to the first time derivative of the conductivity at a time when the second time derivative reaches zero, indicating that the oxidation reaction is complete, from the change in the total conductivity measurement, the remainder being equal to the contribution to conductivity made by oxidation of the organic content of the water.

**EXEMPLARY CLAIMS** - Claim- 1. An apparatus for the measurement of total organic carbon contained in a sample of deionized water, comprising: a sample cell for containing a sample of deionized water; a source of ultraviolet radiation of a frequency which promotes oxidation of organic carbon compounds disposed such that radiation from said source is incident on said sample cell; a pair of electrodes in said cell; means for monitoring the electrical conductivity between said electrodes; means for measuring the temperature of water in the cell; and means for correcting the monitored conductivity as a function of the measured temperature; wherein the exposure of a sample of water containing organic carbon compounds to ultraviolet radiation and the monitoring of the consequent change of electrical conductivity of the sample both take place in said sample cell.

## Citations from U.S. Patent Bibliographic Database: PA2

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**32. Method and apparatus for measuring water content**

PAT 00-00-89 04886088 NDN- 167-0152-6035-0

**INVENTOR(S)-** Ryokai, Kimitoshi; Wakabayashi, Naruki**PATENT NUMBER-** 04886088**PATENT APPLICATION NUMBER-** 152350**DATE FILED-** 1988-02-04**PATENT DATE-** 1989-12-12**NUMBER OF CLAIMS-** 10**EXEMPLARY CLAIMS-** 1**FIGURES-** 12**ART/GROUP UNIT-** 347**PATENT CLASS-** Invention (utility) patent**INVENTOR COUNTRY/ZIPCODE-** JPX; JPX**PATENT ASSIGNEE(S)-** Shimizu Construction Co., Ltd.**ASSIGNEE CITY-** Tokyo**ASSIGNEE COUNTRY-** JPX**ATTORNEY, AGENT, OR FIRM-** Oblon, Spivak, McClelland, Maier & Neustadt**U.S. PATENT CLASS-** 137078300**U.S. CLASSIFICATION REFS.-** X239063000, X374147000**INTERNATIONAL PATENT CLASS-** B05B00906**PATENT REFERENCE(S)-** 4059982; 4261382; 4630036; 4693419**PATENT REFERENCED BY-** 05287734**PATENT APPLICATION PRIORITY-** 62-25870, 62-25871, 62-25872**PRIORITY COUNTRY CODE-** JPX; JPX; JPX**PRIORITY DATE-** 19870206; 19870206; 19870206

According to a method and an apparatus for measuring a water content, a thermal conductivity of a measurement target is measured, and a water content of the measurement target is calculated from the thermal conductivity in accordance with prepared data which represents correlation between a thermal conductivity and a water content of the measurement target. A water content management system controls the water content in accordance with the actual water content. If the water content is excessive, it is informed by an alarm system.

**EXEMPLARY CLAIMS-** Claim- 1. A method of measuring a water content of a soil, comprising the steps of: ; (a) arranging a temperature detection unit in the soil, the temperature detection unit including a heater, a heat sensor and heat conductive accommodating means for accommodating in a spaced manner both the heater and the heat sensor therein; ; (b) energizing the heater; ; (c) the heat sensor receiving heat from the heater to provide temperature signals; ; (d) obtaining a thermal conductivity of the soil on the

basis of the difference between **temperature** signals provided from the heat sensor at a time interval; ; (e) calculating the **water** content from the thermal **conductivity** obtained in the step (d) in accordance with previously obtained data representing a correlation between thermal conductivity and **water** content of the soil.

NO-DESCRIPTORS

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**33. Electrode assembly for in-situ measurement of electrolytic conductivity of boiler water**

PAT 00-00-89 04883566 NDN- 167-0152-3516-0

**INVENTOR(S)**- Muccitelli, John A.; Feldman, Nancy A.

**PATENT NUMBER**- 04883566

**PATENT APPLICATION NUMBER**- 203779

**DATE FILED**- 1988-06-07

**PATENT DATE**- 1989-11-28

**NUMBER OF CLAIMS**- 18

**EXEMPLARY CLAIMS**- 1,10

**FIGURES**- 6

**ART/GROUP UNIT**- 112

**PRIMARY INDUSTRY**- 93-01-BK

**PATENT CLASS**- Invention (utility) patent

**PATENT ASSIGNEE(S)** Betz Laboratories, Inc.

**ASSIGNEE CITY**- Trevose

**ASSIGNEE STATE**- PA

**ATTORNEY, AGENT, OR FIRM**- Caesar, Rivise, Bernstein, Cohen & Pokotilow, Ltd.

**U.S. PATENT CLASS**- 3244500000

**U.S. CLASSIFICATION REFS.**- X204400000; X324439000

**INTERNATIONAL PATENT CLASS**- G01N02702; G01N02726

**PATENT REFERENCE(S)**- 4636292

**PATENT REFERENCED BY**- 05353628

**PATENT STATUS INFO**- 04/02/91, Certificate of Correction, (COR)

An electrode assembly and a method of electrically insulating the electrode assembly for in-situ measurement of electrolytic **conductivity** of boiler or other hot alkaline or neutral water, the electrode assembly comprising calcia/hafnia stabilized zirconia wherein the calcia is present from 3 to 10% by weight and the hafnia is present from 0.5 to 6% by weight.

**EXEMPLARY CLAIMS**- Claim- 1. An electrode assembly for in situ measurement of physical constants of boiler **water** at elevated **temperature** and/or pressure and under variable boiler operating conditions wherein pH can vary between 7 and at least 11, said electrode assembly comprising electrodes supported by stabilized zirconia and wherein electrical current generated by said electrodes in contact with the boiler **water** is conducted by conductive leads supported by said stabilized zirconia, said zirconia being stabilized with about 6% calcia and 3% hafnia or about 1 to 3% magnesia and 1 to 2% hafnia. ; Claim- 10. A method of insulating and using an electrode assembly for performing in situ measurement of physical constants of boiler **water** at elevated **temperature** and/or pressure, at variable boiler operating conditions wherein pH can vary between 7 and at least 11, said method comprising protecting and supporting

electrodes of the assembly with stabilized zirconia, the electrodes of the assembly in said boiler water, transmitting electrical current generated by said electrodes by conductive leads supported by said stabilized zirconia, with said zirconia being stabilized with about 6% calcia and 3% hafnia or about 1 to 3% magnesia and 1 to 2% hafnia, and determining a value by reading the generated electrical current passing through said electrodes.

NO-DESCRIPTORS

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**34. Water quality control method, and method and apparatus for measuring electrical conductivity used in the water quality control**

PAT 00-00-89 04853638 NDN- 167-0149-3625-7

**INVENTOR(S)**- Endou, Masao; Asakura, Yamato; Watanabe, Atsushi; Sakagami, Masaharu; Uchida, Shunsuke; Nagase, Makoto; Baba, Tsutomu; Ohsumi, Katsumi

**PATENT NUMBER**- 04853638

**PATENT APPLICATION NUMBER**- 141424

**DATE FILED**- 1988-01-07

**PATENT DATE**- 1989-08-01

**NUMBER OF CLAIMS**- 15

**EXEMPLARY CLAIMS**- 1

**FIGURES**- 25

**ART/GROUP UNIT**- 267

**PATENT CLASS**- Invention (utility) patent

**INVENTOR COUNTRY/ZIPCODE**- JPX; JPX; JPX; JPX; JPX; JPX; JPX; JPX

**PATENT ASSIGNEE(S)**- Hitachi, Ltd.

**ASSIGNEE CITY**- Tokyo

**ASSIGNEE COUNTRY**- JPX

**ATTORNEY, AGENT, OR FIRM**- Antonelli, Terry & Wands

**U.S. PATENT CLASS**- 3244410000

**U.S. CLASSIFICATION REFS.**- X204408000; X324439000; X324444000; X324650000

**INTERNATIONAL PATENT CLASS**- G01N02706; G01N02702

**PATENT REFERENCE(S)**- 4176031; 4204259; 4238298; 4445091; 4626338; 4682113

**PATENT REFERENCED BY**- 05110537; 05132075; 05289132; 05341678; 05353628; 05596279

**FOREIGN DOCUMENT REFERENCE(S)**- 59-60293

**FOREIGN COUNTRY CODE**- JPX

**PATENT APPLICATION PRIORITY**- 62-1651; 62-114660; 62-221916

**PRIORITY COUNTRY CODE**- JPX; JPX; JPX

**PRIORITY DATE**- 19870109; 19870513; 19870907

Electric conductivities of an aqueous solution under measurement are measured at two or more different temperatures in a range  $T_0$  to  $T_n$ , and a relationship between the electrical conductivity and the temperatures is obtained. A solute substance in the aqueous solution is determined by applying this relationship against a known temperature and electrical conductivity relationship of an individual substance. A concentration of the determined substance is estimated by applying the electrical conductivity at the lowest temperature  $T_0$  to a known relationship between an electrical conductivity and a

concentration at the same temperature  $T_0$  with respect to an individual substance.

**EXEMPLARY CLAIMS-** Claim- 1. A method of water quality control comprising the steps of: ; (a) measuring electrical conductivities of an aqueous solution under measurement at least at a temperature  $T_0$  and a temperature  $T_n$ , and obtaining a relationship between the electrical conductivity and the temperature , wherein the measurement temperature  $T_0$  is in a first range, and the measurement temperature  $T_n$  is in a second range different from said first range, and at least one value of the electrical conductivity is measured in each of the temperature ranges; ; (b) utilizing a determining means to determine a solute substance in said aqueous solution under measurement by applying the relationship obtained in said step (a) to a relationship between a temperature and an electrical conductivity of an individual substance obtained beforehand; and ; (c) utilizing an estimating means to estimate a concentration of the substance determined in said step (b) by applying the electrical conductivity at a lowest temperature  $T_0$  among the measurement temperatures in said first temperature range in said step (a) to a relationship between an electrical conductivity and a concentration at the same temperature  $T_0$  with respect to an individual substance obtained beforehand.

NO-DESCRIPTORS .

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**35. System and method for detecting contaminants in a steam power generating system**

PAT 00-00-89 04822744 NDN- 167-0146-2772-8

**INVENTOR(S)-** Bellows, James C.

**PATENT NUMBER-** 04822744

**PATENT APPLICATION NUMBER-** 044623

**DATE FILED-** 1987-05-01

**PATENT DATE-** 1989-04-18

**NUMBER OF CLAIMS-** 15

**EXEMPLARY CLAIMS-** 5,8

**FIGURES-** 3

**ART/GROUP UNIT-** 181

**PRIMARY INDUSTRY-** 93-01-BK

**PATENT CLASS-** Invention (utility) patent

**PATENT ASSIGNEE(S)-** Westinghouse Electric Corp.

**ASSIGNEE CITY-** Pittsburgh

**ASSIGNEE STATE-** PA

**ATTORNEY, AGENT, OR FIRM-** Abeles, D. C.

**U.S. PATENT CLASS-** 436038000

**U.S. CLASSIFICATION REFS. -** X422070000; X422082020; X422082030; X422083000; X422089000; X436110000; X436119000; X436125000; X436126000; X436149000; X436150000; X436161000

**INTERNATIONAL PATENT CLASS-** G01N02700

**PATENT REFERENCE(S)-** 3158444; 3904365; 4251219; 4251220; 4283200; 4472354; 4622306

**PATENT REFERENCED BY -** 04978506; 05041386; 05073499; 05482862; 05521510; 05565619; 05663489; 05681531

**PATENT STATUS INFO-** 07/06/93, Expiration Due to Failure to Pay Maintenance Fees, (EXP)

Method for monitoring changes in contaminant concentration levels between a feedwater inlet and a steam outlet in a steam generating system and system for detecting sources of contaminants in a steam generating system. The method includes a reliable means for detecting organic contaminants, chlorides, sulfides and nitrides. The invention also includes a method for determining whether the organic compounds are chlorinated, sulfinated or nitrogenated. The method is based on monitoring of ion concentration levels and cation exchanged conductivities in samples of feedwater and steam.

**EXEMPLARY CLAIMS-** Claim- 5. A method for detecting increases in chloride ion concentration in a **water** heating system comprising a **water** heater which receives feedwater from at least one inlet pipe and which provides high **temperature** fluid through at least one outlet pipe, the method comprising the steps of: ; (a) monitoring chloride ion concentration in a sample of feedwater; ; (b) monitoring chloride ion concentration in a high **temperature** fluid sample; and ; (c) determining whether the chloride ion concentration in the high **temperature** fluid sample is greater than the chloride ion concentration in the feedwater sample an increase in chloride ion concentration indicating a breakdown of chlorinated compounds. ; Claim- 8. A method for detecting a presence of organic compounds and a formation of carboxylic acids in a steam generating system comprising a steam generating system comprising a steam generator which receives feedwater from at least one inlet pipe and which provides steam through at least one outlet pipe, the method comprising the steps of ; (a) monitoring hydrogen cation exchanged **conductivity** in a sample of feedwater; ; (b) monitoring hydrogen cation exchanged **conductivity** in a steam sample; and ; (c) determining whether the hydrogen cation exchanged **conductivity** of the steam sample is greater than the cation **conductivity** of the feedwater sample, wherein an increase in hydrogen cation exchanged **conductivity** is indicative of carboxylic acid formation from organic compounds.

NO-DESCRIPTORS .

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**36. Detection of exhaust gas spillage from naturally aspirated gas furnaces and naturally aspirated gas hot water heaters**

PAT 00-00-88 04751912 NDN- 167-0138-4921-3

**INVENTOR(S)-** Monette, Michael

**PATENT NUMBER-** 04751912

**PATENT APPLICATION NUMBER-** 894080

**DATE FILED-** 1986-08-06

**PATENT DATE-** 1988-06-21

**NUMBER OF CLAIMS-** 19

**EXEMPLARY CLAIMS-** 1

**FIGURES-** 8

**ART/GROUP UNIT-** 345

**PATENT CLASS-** Invention (utility) patent

**INVENTOR COUNTRY/ZIPCODE-** CAX

**ATTORNEY, AGENT, OR FIRM-** French, David J.

**U.S. PATENT CLASS-** 12630700AO

**U.S. CLASSIFICATION REFS.-** X116216000; X116217000; X374162000; X431022000

**INTERNATIONAL PATENT CLASS-** F23J01100

**PATENT REFERENCE(S)-** 2308087; 3576761; 4150572; 4189942; 4280441; 4459046

**PATENT REFERENCED BY-** 05143050; 05280802; 05487352; 05598833

**FOREIGN DOCUMENT REFERENCE(S)-** 2260517

**FOREIGN COUNTRY CODE- DEX**

A device for detecting the diversion of gas furnace or gas hot water heater exhaust into a dwelling due to chimney backdrafting detects a sustained rise in the temperature of the gases passing through the draft-diverter orifice. A significant rise in temperature indicates that the above condition has occurred. This temperature rise is recorded only after the condition has persisted for a sufficiently long period of time, thereby avoiding the recording of temporary backdrafting conditions which are not required to be recorded. The device consists of a high temperature resistant plastic strip or other material with similar conductivity and specific heat qualities with a temperature sensitive color-change material mounted on the surface of the plastic strip at one end of the strip. This strip is attached to the furnace or gas hot water heater in a preferred location with the color-change material facing away from the normal flow of backdrafting exhaust gases. Heat from the backdrafting flow causes the color-change material to change color once the heat in the gas flow has penetrated through the underlying plastic strip. An aerodynamic stagnation zone on the front face of the plastic strip during a backdraft condition prevents the color-change material from changing color prematurely.

**EXEMPLARY CLAIMS-** Claim- 1. A device for detecting the prolonged diversion of combustion exhaust gases into a dwelling through the flue gas diverter opening of a gas-fired furnace or hot water heater comprising: ; (a) a strip of ~~temperature~~ resistant material of relatively thin thickness and extended longitudinal dimension, ; (b) said strip having on one end thereof attachment means adapted to fasten said strip along the border of a flue gas diverter opening, with one surface facing outwardly in the direction of flow of diverted flue gas, ; (c) said strip having deposited on its surface at its other end a ~~temperature~~ sensitive irreversible color-change material, located on the outwardly facing surface of said strip, ; wherein the material and dimensions of said strip have been selected to provide a predetermined delay in the rise of the ~~temperature~~ of said color-change material to combustion exhaust gases being diverted through a flue gas diverter, so as to provide a delayed indication of the flow of combustion exhaust gases through said flue gas diverter.

NO-DESCRIPTORS .

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**37. Double indicator pulmonary edema measurement**

PAT 00-00-87 04676252 NDN- 167-0130-2853-9

**INVENTOR(S)-** Trautman, Edwin D.; Newbower, Ronald S.

**PATENT NUMBER-** 04676252

**PATENT APPLICATION NUMBER-** 786341

**DATE FILED-** 1985-10-09

**PATENT DATE-** 1987-06-30

**NUMBER OF CLAIMS-** 20

**EXEMPLARY CLAIMS-** 1

**FIGURES-** 4

**ART/GROUP UNIT-** 335

**SUPPLEMENTARY NOTE(S)-** The invention described herein was made in the course of work under a grant or award from the Department of Health and Human Services.

**PATENT CLASS-** Invention (utility) patent

**PATENT ASSIGNEE(S)-** Massachusetts General Hospital

**ASSIGNEE CITY-** Boston

**ASSIGNEE STATE- MA**

**ATTORNEY, AGENT, OR FIRM- Weingarten, Schurigin, Gagnebin & Hayes**

**U.S. PATENT CLASS- 1286710000**

**U.S. CLASSIFICATION REFS.- X128692000; X128716000**

**INTERNATIONAL PATENT CLASS- A61B00508**

**PATENT REFERENCE(S)- 4230126**

**PATENT REFERENCED BY- 04811741; 04860759; 04901734; 05092339; 05595181**

**FOREIGN DOCUMENT REFERENCE(S)- 621344**

**FOREIGN COUNTRY CODE- SUX**

Patient monitoring method and apparatus for measurement of in vivo extra vascular lung water (pulmonary edema) and pulmonary circulatory system thermal bypass utilizing double indicator dilution with temperature and electrical conductivity modifiers. A thermal modifier is utilized for a primary indicator dilution measurement with electrical conductivity provided as a reference indicator which in turn is corrected for temperature effects produced by the thermal moderator as well as effects of plasma characteristics. Thermal and conductivity sensors are both placed upstream and downstream of the lungs in the pulmonary artery and the systemic arterial system, and a thermal and conductivity moderator is injected at a site upstream from both. Temperature and conductivity are detected at both sites and the conductivity signal is converted to a volume dilution valve. Lung water is then determined as a function of the mean transit time difference of the two sensed temperatures less the mean transit time difference for the two conductivity based volume dilutions. Because the measurement is based on four sensors and mean transit time differences are used, in vivo error sources merely act as more signal and do not affect the final values. The detected signals are also analyzed in a manner to yield information on thermal bypass. The measurement technique disclosed is useful in correcting the effects of a conductivity indicator for thermal and blood effects however employed.

**EXEMPLARY CLAIMS -** Claim- 1 A method for measuring extra vascular lung water in vivo comprising the steps of: ; injecting a temperature and conductivity modifier into the blood circulatory system in a location whereby the modifier passes through the pulmonary vascular system; ; measuring temperature and conductivity in the circulatory system downstream of the point of modifier injection including respective locations upstream and downstream of the pulmonary vascular system to provide two temperature and two conductivity measurements; ; The injection of the thermal diluent causing a disturbance in the measured conductivity ; ; adjusting the measured conductivity as a function of at least one property other than hematocrit of blood selected from the group consisting of temperature , osmolality, red cell form factor, water content and ion dissociation factor whereby the disturbance of the thermal diluent on measured conductivity is corrected; and ; determining the extra vascular lung water value from measured temperature and adjusted conductivity .

NO-DESCRIPTORS .

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**38. Method for determining the pH value of deionized water**

PAT 00-00-84 04445091 NDN- 167-0105-3558-0

**INVENTOR(S)- Ksebauch, Walter; Renner, Theodor**

**PATENT NUMBER- 04445091**

**PATENT APPLICATION NUMBER- 279201**

**DATE FILED- 1981-06-30**

**PATENT DATE**- 1984-04-24

**NUMBER OF CLAIMS**- 8

**EXEMPLARY CLAIMS**- 2

**FIGURES**- 2

**ART/GROUP UNIT**- 252

**PRIMARY INDUSTRY**- 93-01-BK

**PATENT CLASS**- Invention (utility) patent

**INVENTOR COUNTRY/ZIPCODE**- DEX; DEX

**PATENT ASSIGNEE(S)**- Siemens Aktiengesellschaft

**ASSIGNEE CITY**- Munich

**ASSIGNEE COUNTRY**- DEX

**ATTORNEY, AGENT, OR FIRM**- Kenyon & Kenyon

**U.S. PATENT CLASS**- 3244380000

**U.S. CLASSIFICATION REFS.**- X324439000

**INTERNATIONAL PATENT CLASS**- G01N02756

**PATENT REFERENCE(S)**- 3681025; 3904365

**PATENT REFERENCED BY**- 04691168; 04853638

**PATENT APPLICATION PRIORITY**- 3027306

**PRIORITY COUNTRY CODE**- DEX

**PRIORITY DATE**- 19800718

**PATENT STATUS INFO**- 06/30/92, Expiration Due to Failure to Pay Maintenance Fees, (EXP)

A method for determining the pH value of deionized cooling water in a system with a main loop and at least one parallel loop in which the electric conductivity of the cooling water in the main loop and the electric conductivity of the cooling water in the parallel loop behind an ion exchanger is measured and the  $\text{H}^+$  ion concentration is derived therefrom.

**EXEMPLARY CLAIMS**- Claim- 2. A method for determining a pH of basic deionized water in a cooling water system for an electrical device comprising diverting a portion of the water through a cation exchanger loop in parallel with the system; measuring a first electric conductivity  $X_{sub 1}$  of the water before the exchanger; measuring a second electric conductivity  $X_{sub 2}$  of the water after the exchanger; determining the water temperature; obtaining a mean cation mobility  $1_{sub k}$ , a mean anion mobility  $1_{sub a}$ , a hydroxide ion mobility  $1_{sub OH}$ , a hydrogen ion mobility  $1_{sub H}$  and a water ionicity  $K_w$  at said temperature by reference to a standard table of ion mobilities in aqueous solution and a table of water ionicity as a function of temperature; and using a computing means to solve an equation for the pH, which equation is:  $\text{pH} = -\log (1_{sub k} + 1_{sub OH})1000K_{sub w} + \log X_{sub 1} - X_{sub 2} 1_{sub k} + 1_{sub a} + 1_{sub H}$ ; and produce the pH value.

NO-DESCRIPTORS

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### 39. Method and means for measuring moisture content of hermetic semiconductor devices

PAT 00-00-81 04272986 NDN- 167-0086-5631-3

**INVENTOR(S)**- Lowry, Robert K.; Miller, Larry A.

**PATENT NUMBER**- 04272986

**PATENT APPLICATION NUMBER**- 030498

**DATE FILED-** 1979-04-16

**PATENT DATE-** 1981-06-16

**NUMBER OF CLAIMS-** 23

**EXEMPLARY CLAIMS-** 1

**FIGURES-** 4

**ART/GROUP UNIT-** 244

**PRIMARY INDUSTRY-** 93-01-BK

**PATENT CLASS-** Invention (utility) patent

**PATENT ASSIGNEE(S)-** Harris Corporation

**ASSIGNEE CITY-** Melbourne

**ASSIGNEE STATE-** FL

**ATTORNEY, AGENT, OR FIRM-** Leitner, Palan, Martin & Bernstein

**U.S. PATENT CLASS** 0730730000

**U.S. CLASSIFICATION REFS.-** X257048000; X324696000; X338035000

**INTERNATIONAL PATENT CLASS-** G01N02718

**PATENT REFERENCE(S)-** 3890703; 3943557; 4050048; 4057823; 4143177

**PATENT REFERENCED BY-** 04343688; 04523142; 04775831; 04870252; 04934181; 05606264

**FOREIGN DOCUMENT REFERENCE(S)-** 2702487

**FOREIGN COUNTRY CODE-** DEX

**PATENT STATUS INFO-** 10/27/81, Certificate of Correction, (COR)

The moisture content of a hermetically sealed semiconductor device is a function of the dew point of the cavity atmosphere which is the temperature of maximum surface conductivity. A pattern of interdigitated thin film aluminum conductors is provided on an impurity free, non-porous silicon oxide insulative substrate. The surface conductivity of this structure rises as moisture condenses onto and between the conductors as the temperature is reduced at a slow controlled rate to the dew point temperature. The amplitude of the maximum surface conductivity is proportional to ionic impurity concentration.

**EXEMPLARY CLAIMS-** Claim- 1. A method of measuring the amount of moisture in a hermetically sealed semiconductor device package comprising: ; providing parallel conductive elements having a thickness no greater than 12,000 angstroms and a separation of no greater than 0.5 mils on an insulative surface is said package; ; simultaneously lowering the temperature of said package at a rate no greater than 15 degrees centigrade per minute to condense the water vapor and measuring the conductivity between said conductive elements, and ; determining the moisture content from the temperature of maximum conductivity .

NO-DESCRIPTORS .

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**40. Apparatus and method for determining electrical conductivity of water vapor**

PAT 00-00-81 04270084 NDN- 167-0086-2731-3

**INVENTOR(S)-** Carlon, Hugh R.; Pritt, Rex M.

**PATENT NUMBER-** 04270084

**PATENT APPLICATION NUMBER-** 055716

**DATE FILED-** 1979-07-09

**PATENT DATE-** 1981-05-26

**NUMBER OF CLAIMS- 11**

**EXEMPLARY CLAIMS- 1**

**FIGURES- 6**

**ART/GROUP UNIT- 252**

**SUPPLEMENTARY NOTE(S)-** The invention described herein may be manufactured, used and licensed by or for the Government for Governmental purposes without the payment to us of any royalty thereon.

**PATENT CLASS-** Invention (utility) patent

**PATENT ASSIGNEE(S)-** The United States of America as represented by the Secretary of the Army

**ASSIGNEE CITY- Washington**

**ASSIGNEE STATE- DC**

**ATTORNEY, AGENT, OR FIRM-** Edelberg, Nathan; Gibson, Robert P.; Yarmovsky, Max

**U.S. PATENT CLASS- 3246940000**

**U.S. CLASSIFICATION REFS.- X324071100**

**INTERNATIONAL PATENT CLASS- G01R02702**

**PATENT REFERENCE(S)-** 2636927; 3553576; 3990066

**FOREIGN DOCUMENT REFERENCE(S)-** 2701197

**FOREIGN COUNTRY CODE- DEX**

An apparatus and method are disclosed for measuring the conductivity or number of water ion clusters present in a moist air environment. A test chamber is utilized for operatively simultaneously holding a "dummy"reference cell and a "large"conductivity cell having substantially the same leakage resistance. The cells are designed to have "cell factor"ratios substantially different from each other. A D.C. power source with an in series vacuum-tube voltmeter is used to alternately measure the voltage drop of each cell under the similar variable ambient conditions. The conductivity or number of ion cluster present in the test environment is determined by a calculation using voltage compensated values and by graphical extrapolation.

**EXEMPLARY CLAIMS-** Claim- 1. An apparatus for determining the conductivity and number of water ion clusters in a moist air environment which comprises: ; a test chamber having a main chamber section, an access compartment section proximately disposed adjacent to said main chamber section, and glove means for permitting the changing of electrical connections within said main chamber section; ; means for introducing moist air into said main chamber section; ; first plate means proximately disposed in said test chamber for providing a comparative reference insulator leakage level; ; second plate means proximately positioned adjacent said first plate means, having a "cell factor"approximately 25 times larger than said first plate means, for collecting water ion clusters in said moist air environment; ; power supply means for applying DC voltage alternately to said first and second plates means; ; a vacuum tube voltmeter electrically connected in series with said power supply means and said first or second plate means; and ; temperature measuring means for determining the temperature of a moist air sample within said test chamber.

NO-DESCRIPTORS

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41. Apparatus for and method of determining high pressure, high temperature feedwater contaminants

PAT 00-00-81 04251220 NDN- 167-0084-3906-5

**INVENTOR(S)-** Larson, Thurston E.; Lane, Russell W.; Neff, Chester H.

**PATENT NUMBER-** 04251220

**PATENT APPLICATION NUMBER-** 955972

**DATE FILED-** 1978-10-30

**PATENT DATE-** 1981-02-17

**NUMBER OF CLAIMS-** 7

**EXEMPLARY CLAIMS-** 1

**FIGURES-** 2

**ART/GROUP UNIT-** 173

**PATENT CLASS-** Invention (utility) patent

**INVENTOR COUNTRY/ZIPCODE-** 61820; 61820; 61820

**ATTORNEY, AGENT, OR FIRM-** Brown, Charles H.

**U.S. PATENT CLASS-** 4361030000

**U.S. CLASSIFICATION REFS.** - X210662000; X210664000; X422076000; X422082020; X422106000; X436119000; X436125000; X436150000

**INTERNATIONAL PATENT CLASS-** G01N02702; G01N03318; G05D00900

**PATENT REFERENCE(S)-** 2617766; 2832673; 3158444; 3495943, 3897213

**PATENT REFERENCED BY** - 04801551; 04814281; 04822744; 05041386; 05521510; 05565619; 05663489

Apparatus of high sensitivity and accuracy for detecting and measuring very low levels of chlorides, sulfates, phosphates and nitrates in high pressure, high temperature feedwater present in once-through and supercritical boilers, nuclear reactors and cogeneration systems. A sample of feedwater at 350 degrees F. and above is maintained near atmospheric boiling point in a vented chamber where volatile gases, mainly carbon dioxide, are removed by venting. The effluent from this chamber passes through a flow-type conductivity cell, is cooled to 20 degrees -40 degrees C. and flows upward through a hydrogen exchange resin bed at a flow rate of approximately 250 and 1,000 ml/min and higher. Subsequent reboiling of the condensate in a reboil chamber with the help of a small orifice valve through which a part of the hot feedwater sample passes provides constant temperature control of the condensate at or near atmospheric boiling and at a constant level prior to flow through another flow-type conductivity cell. This last cell measures the conductivity of the chlorides, sulfates, phosphates and nitrates in the converted acid form and indicates the extent of the contaminants of the foregoing substances in the feedwater. A recorder electrically connected to both cells enables observation of the difference in conductivity between the two cells, thereby providing an approximation of the amine or ammonia content in the high pressure, high temperature feedwater. Individual small orifice valves control the volume and rate of flow of the feedwater supplied to both the vented and reboil chambers.

**EXEMPLARY CLAIMS** - Claim- 1. Purity analyzer apparatus for continuously monitoring and measuring low levels of chloride, sulfate, phosphate and nitrate, of the order of 1-5 mu g/l in high pressure feedwater having a temperature of 350 degrees F. and above, comprising means defining an upper chamber, means defining a reboil chamber below said upper chamber, means for supplying a sample of said high pressure feedwater at a temperature of 350 degrees F. and above and at a flow rate between 250 ml/min and 1000 ml/min to both said upper and reboil chambers over separate paths, an adjustable small orifice regulating valve having an opening which is in the approximate range of 0.01 double prime to 0.02 double prime in each of said paths, a bed of hydrogen exchange resin below said reboil chamber and separated therefrom by a screen through which effluent from said bed can flow, a perforated water distributor plate at the bottom of said resin bed, first and second flow-type conductivity cells, means defining a water flow path from the lower part of said upper chamber to said first cell, a cooling chamber having a hollow cooling coil one end of which communicates with the bottom of said resin bed through said distributor plate and the other end of which communicates with said first cell, whereby water passing from said first cell to said resin bed is cooled, an adjustable valve located between said other end and said first cell for regulating the flow rate through said resin bed, means defining a water flow path from said

reboil chamber to said second cell, and conductivity recording and indicating means electrically connected to both cells.

NO-DESCRIPTORS

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Citations from U.S. Patent Bibliographic Database: PA3

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**42. LIQUID CONDUCTIVITY MEASURING APPARATUS**

PAT 00-00-76 03963979 NDN- 166-0053-4442-1

**INVENTOR(S)- DAUPHINEE, THOMAS M.**

**PATENT NUMBER-** 03963979

**PATENT APPLICATION NUMBER-** 495100

**DATE FILED-** 1974-08-05

**PATENT DATE-** 1976-06-15

**NUMBER OF CLAIMS-** 6

**EXEMPLARY CLAIMS-** 1

**FIGURES-** 5

**ART/GROUP UNIT-** 252

**PATENT CLASS-** Invention (utility) patent

**INVENTOR COUNTRY/ZIPCODE-** CA

**PATENT ASSIGNEE(S)-** CANADIAN PATENTS AND DEVELOPMENT LIMITED

**ASSIGNEE CITY-** OTTAWA

**ASSIGNEE COUNTRY-** CA

**ATTORNEY, AGENT, OR FIRM-** HUGHES, JAMES R.

**U.S. PATENT CLASS-** 3244440000

**U.S. CLASSIFICATION REFS.-** X204274000; X324433000

**INTERNATIONAL PATENT CLASS-** G01N02742

**PATENT REFERENCE(S)-** 2901327; 3561917; 3645802; 3701006; 3781675

**PATENT REFERENCED BY-** 04020677; 04511845; 04713347; 05749986

A SALINOMETER APPARATUS FOR MEASURING THE SALINITY ( CONDUCTIVITY ) OF A LIQUID SAMPLE FROM A STANDARD SAMPLE BOTTLE OR OTHER CONTAINER HAVING AN ELONGATED TUBE HAVING ONE END ADAPTED FOR INSERTION INTO A SAMPLE BOTTLE OR CONTAINER, A CONDUCTIVITY MEASURING CELL FORMED OF A GLASS TUBE HAVING AN ELONGATED MAIN BODY PORTION, FOUR UPWARDLY EXTENDING BRANCH TUBES CONNECTED TO THE MAIN TUBE AND HAVING LIQUID SEALS AT THEIR UPPER ENDS, METAL ELECTRODES MOUNTED INSIDE THE FOUR BRANCH TUBES, TWO

OF THE ELECTRODES FORMING POTENTIAL ELECTRODES AND THE OTHER TWO FORMING CURRENT ELECTRODES, ELECTRICAL LEADS PASSING THROUGH THE SEALS AND CONNECTED TO THE FOUR ELECTRODES, SAID CELL BEING CONNECTED AT ONE END TO THE ELONGATED TUBE AND THE OTHER TO WASTE, A TEMPERATURE CONTROLLED LIQUID BATH, TEMPERATURE CHANGING MEANS ASSOCIATED WITH SAID BATH, AN ELECTRIC HEATING AND CONTROL CIRCUIT CONNECTED TO SAID HEATING MEANS, THE SAID CONDUCTIVITY CELL AND A PORTION OF THE ELONGATED TUBE BEING IMMersed IN SAID BATH, MEANS FOR FLUSHING THE CONDUCTIVITY CELL BETWEEN SAMPLE MEASUREMENTS, AIR PRESSURE MEANS FOR CONNECTION TO THE SAMPLE HOLDER FOR POSITIVELY FORCING A PORTION OF THE LIQUID SAMPLE OUT OF THE SAMPLE HOLDER INTO AND THROUGH THE ELONGATED TUBE AND CONDUCTIVITY CELL, AND A CONDUCTIVITY MEASURING CIRCUIT CONNECTED TO THE POTENTIAL AND CURRENT ELECTRODE LEADS FOR MEASURING THE CONDUCTIVITY OF THE LIQUID CONTAINED IN THE CELL.

**EXEMPLARY CLAIMS-** Claim- 1. A LIQUID CONDUCTIVITY MEASURING APPARATUS FOR MEASURING THE SALINITY OF A LIQUID SAMPLE FROM A STANDARD SAMPLE BOTTLE OR OTHER CONTAINER COMPRISING: ; A. AN ELONGATED TUBE HAVING ONE END ADAPTED FOR INSERTION INTO A SAMPLE BOTTLE OR CONTAINER, ; B. A MEASURING CELL FOR MEASURING THE CONDUCTIVITY OF A WATER SAMPLE FORMED OF A TUBE HAVING AN ELONGATED MAIN BODY PORTION CONNECTED AT ONE END TO THE ELONGATED TUBE AND AT THE OTHER TO WASTE, FOUR UPWARDLY EXTENDING BRANCH TUBES CONNECTED TO THE MAIN TUBE AND HAVING LIQUID SEALS AT THEIR UPPER ENDS, ELECTRODES MOUNTED INSIDE THE FOUR BRANCH TUBES, TWO OF THE ELECTRODES FORMING POTENTIAL ELECTRODES AND THE OTHER TWO FORMING CURRENT ELECTRODES, ELECTRICAL LEADS PASSING THROUGH THE SEALS AND CONNECTED TO THE FOUR ELECTRODES, ; C. MEANS FOR CONTROLLING THE TEMPERATURE OF SAID CELL, ; D. MEANS FOR FLUSHING THE CONTENTS OF THE CELL TO WASTE BETWEEN SAMPLE MEASUREMENTS, AND ; E. AIR PRESSURE MEANS FOR CONNECTION TO THE SAMPLE HOLDER FOR POSITIVELY FORCING A PORTION OF THE LIQUID SAMPLE OUT OF THE SAMPLE HOLDER INTO AND THROUGH THE SAID TUBE AND INTO THE MEANS FOR MEASURING THE CONDUCTIVITY, AND ; F. A CONDUCTIVITY MEASURING CIRCUIT CONNECTED TO THE POTENTIAL AND CURRENT ELECTRODE LEADS FOR MEASURING THE CONDUCTIVITY OF THE LIQUID SAMPLE IN THE CELL SAID CIRCUIT COMPRISING: A STANDARD RESISTANCE, A CURRENT SOURCE CONNECTED IN SERIES WITH THE STANDARD RESISTANCE AND THE CURRENT ELECTRODES OF THE CELL, A VOLTAGE COMPARATOR CONNECTED TO THE POTENTIAL ELECTRODES OF THE CELL AND TO A SOURCE OF REGULATED SQUARE WAVE VOLTAGE SUCH AS TO COMPARE THE VOLTAGE ACROSS THE POTENTIAL ELECTRODES AND THE SQUARE WAVE VOLTAGE SUCH AS TO CAUSE IT TO PROVIDE A CURRENT THROUGH THE STANDARD RESISTANCE AND THE CURRENT ELECTRODES SUCH THAT THE VOLTAGE COMPARATOR IS BROUGHT TO A NULL, A LINEAR VOLTAGE COMPARATOR CONNECTED ACROSS THE STANDARD RESISTANCE AND TO A VOLTAGE RELATED TO THE REGULATED SQUARE WAVE VOLTAGE TO COMPARE THIS VOLTAGE AND THE VOLTAGE ACROSS THE STANDARD RESISTANCE AND PROVIDE AN OUTPUT SQUARE WAVE VOLTAGE RELATED TO THE CONDUCTIVITY OF THE CELL, A SQUARE WAVE TO DC AMPLIFIER CONNECTED TO THE LINEAR VOLTAGE COMPARATOR FOR CHANGING THE OUTPUT VOLTAGE TO DC, A DC AMPLIFIER CONNECTED TO THE SQUARE WAVE TO DC AMPLIFIER, AND READOUT MEANS CONNECTED TO THE DC AMPLIFIER.

NO-DESCRIPTORS .

**43 . METHOD AND MEANS FOR QUANTITATIVE ANALYSIS OF SULFURIC ACID-CONTAINING GASES**

PAT 00-00-75 03915646 NDN- 166-0048-5381-2

**INVENTOR(S)- HARRIS, BERNARD; RICHARDS, LORENZO WILLARD**

**PATENT NUMBER- 03915646**

**PATENT APPLICATION NUMBER- 510179**

**DATE FILED- 1974-09-30**

**PATENT DATE- 1975-10-28**

**NUMBER OF CLAIMS- 9**

**EXEMPLARY CLAIMS- 1**

**FIGURES- 2**

**ART/GROUP UNIT- 171**

**PATENT CLASS- Invention (utility) patent**

**PATENT ASSIGNEE(S)- CABOT CORPORATION**

**ASSIGNEE CITY- BOSTON**

**ASSIGNEE STATE- MA**

**ATTORNEY, AGENT, OR FIRM - SCHUMAN, JACK; BLAKER, BARRY R.; CHALETSKY, LAWRENCE A.**

**U.S. PATENT CLASS- 3240711000**

**U.S. CLASSIFICATION REFS. - X073023210, X422090000; X436009000; X436102000; X436151000**

**INTERNATIONAL PATENT CLASS- G01N00122; G01N03106; G01N02706**

**PATENT REFERENCE(S)- 2953441; 3367747; 3698159**

**PATENT REFERENCED BY- 04219398; 04272247**

THERE IS DISCLOSED A METHOD AND MEANS FOR THE QUANTITATIVE ANALYSIS OF SULFURIC ACID CONTAINED AS A VAPOR OR AEROSOL IN A SAMPLE GAS. THE SAMPLE GAS IS CONTACTED WITH A WATER EXTRACTANT HAVING A SUBSTANTIAL EXPOSED SURFACE, THEREBY TO COLLECT THE SULFURIC ACID COMPONENT THEREIN. THE RESULTING WATER/SULFURIC ACID SOLUTION IS DILUTED WITH A FURTHER AMOUNT OF WATER AND THE ELECTRICAL CONDUCTIVITY OF THE RESULTING LIQUID ALIQUOT IS MEASURED, SAID CONDUCTIVITY BEING RELATED TO THE CONCENTRATION OF SULFURIC ACID THEREIN.

**EXEMPLARY CLAIMS -** Claim- 1. A METHOD FOR THE QUANTITATIVE ANALYSIS OF SULFURIC ACID CONTAINED AS AN AEROSOL OR VAPOR IN A CARRIER GAS WHICH COMPRISES: ; A. PROVIDING AN ENCLOSED COLLECTION ZONE HAVING AN OUTLET COMPRISING A GAS PERMEABLE, POROUS, WATER WETTABLE AND INERT FILTER MEDIUM; ; B. WETTING SAID FILTER MEDIUM WITH A SMALL KNOWN QUANTITY OF LIQUID WATER EXTRACTANT TO PROVIDE SAID WATER EXTRACTANT ENTRAINED IN LIQUID FORM IN THE FILTER MEDIUM AND HAVING A SUBSTANTIALLY EXPOSED SURFACE; ; C. INTRODUCING SAID CARRIER GAS INTO SAID ENCLOSED COLLECTION ZONE TO CAUSE CONTACT THEREOF WITH SAID WETTED POROUS FILTER MEDIUM; ; D. BACKWASHING SAID FILTER MEDIUM FROM THE DOWNSTREAM SIDE THEREOF WITH

AN ADDITIONAL KNOWN QUANTITY OF WATER EXTRACTANT TO PROVIDE A VOLUME OF SULFURIC ACID-CONTAINING AQUEOUS ALIQUOT; AND ; E. DETERMINING THE ELECTRICAL CONDUCTIVITY AND TEMPERATURE OF SAID ALIQUOT.

NO-DESCRIPTORS

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**44. STANDARD CONDUCTIVITY CELL FOR MEASUREMENT OF SEA WATER SALINITY AND TEMPERATURE**

PAT 00-00-75 03906354 NDN- 166-0047-6092-5

**INVENTOR(S)- MURDOCK, LAWRENCE C.**

**PATENT NUMBER- 03906354**

**PATENT APPLICATION NUMBER- 404564**

**DATE FILED- 1973-10-09**

**PATENT DATE- 1975-09-16**

**NUMBER OF CLAIMS- 14**

**EXEMPLARY CLAIMS- 1**

**FIGURES- 11**

**ART/GROUP UNIT- 258**

**PATENT CLASS- Invention (utility) patent**

**PATENT ASSIGNEE(S)- WESTINGHOUSE ELECTRIC CORPORATION**

**ASSIGNEE CITY- PITTSBURGH**

**ASSIGNEE STATE- PA**

**ATTORNEY, AGENT, OR FIRM- SCHRON, D.**

**U.S. PATENT CLASS- 3244480000**

**U.S. CLASSIFICATION REFS.- X204408000; X324433000; X374185000**

**INTERNATIONAL PATENT CLASS- G01N02742**

**PATENT REFERENCE(S)- 2330394; 2733201; 3147431; 3479580; 3549989**

**PATENT REFERENCED BY- 04928065**

A STANDARD CONDUCTIVITY CELL HAVING CONCENTRIC THIN-WALLED ALUMINA CYLINDERS WITH A THIN FILM OR LAYER OF STANDARD SEAWATER CONTAINED BETWEEN THEM. ELECTRICAL CONTACT IS MADE TO THE STANDARD SEAWATER BY END ELECTRODES AND A PRESSURE COMPENSATION ARRANGEMENT ALLOWS FOR THE CELL'S USE AT GREAT DEPTHS IN THE WATER. WITH A KNOWN RELATIONSHIP BETWEEN CONDUCTIVITY AND TEMPERATURE, THE CELL ALSO OPERATES AS A VERY RAPID TEMPERATURE SENSOR.

**EXEMPLARY CLAIMS -** Claim- 1. A STANDARD CELL COMPRISING: ; A. FIRST AND SECOND ELECTRICALLY INSULATIVE, RELATIVELY THIN MEMBERS HAVING SPACED APART SURFACE PORTIONS; ; B. A THIN FILM OF A STANDARD SAMPLE OF ELECTRICALLY CONDUCTING LIQUID OF A KNOWN PREDETERMINED PARAMETER CONTAINED BETWEEN SAID SURFACE PORTIONS AND HAVING A THICKNESS LESS THAN THE THICKNESS OF AT LEAST ONE OF SAID INSULATIVE MEMBERS; AND ; C. FIRST AND SECOND ELECTRODES SUPPORTED BY SAID INSULATIVE MEMBERS AND BEING IN ELECTRICAL CONTACT WITH SAID STANDARD SAMPLE.

NO-DESCRIPTORS.

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**45. WATER QUALITY ANALYSIS SYSTEM WITH MULTICIRCUIT SINGLE SHELL HEAT EXCHANGER**

PAT 00-00-75 03880226 NDN- 166-0044-9978-0

**INVENTOR(S)-** HOUSER, EDWIN A.; SCHWINDT, BERNELL W.

**PATENT NUMBER-** 03880226

**PATENT APPLICATION NUMBER-** 446130

**DATE FILED-** 1974-02-27

**PATENT DATE-** 1975-04-29

**NUMBER OF CLAIMS-** 6

**EXEMPLARY CLAIMS-** 1

**FIGURES-** 14

**ART/GROUP UNIT-** 342

**PATENT CLASS-** Invention (utility) patent

**INVENTOR COUNTRY/ZIPCODE-** 92634; 94396

**ATTORNEY, AGENT, OR FIRM-** STEINMEYER, R. J.; HARDER, P. R.

**U.S. PATENT CLASS-** 1650111000

**U.S. CLASSIFICATION REFS.-** X073863110, X073863310

**INTERNATIONAL PATENT CLASS-** F22B03738

**PATENT REFERENCE(S)-** 2687185; 3142171; 3649167

**PATENT REFERENCED BY-** 04775005; 04838098; 05246062; 05363874

A MODULAR WATER QUALITY ANALYSIS SYSTEM FOR STEAM ELECTRIC POWER GENERATING PLANTS IS DISCLOSED WHICH INCLUDES A NOVEL SINGLE SHELL MULTICIRCUIT HEAT EXCHANGER HAVING MEANS TO INDIVIDUALLY VARY THE RATE OF FLOW OF COOLING WATER THROUGH EACH OF THE MULTIPLE CIRCUITS THEREIN SO THAT THE SINGLE HEAT EXCHANGER CAN SIMULTANEOUSLY COOL A PLURALITY OF SAMPLES ENTERING IT AT WIDELY DIFFERING HIGH INLET TEMPERATURES TO THE SAME LOWER RANGE OF OUTLET TEMPERATURES. THE HEAT EXCHANGER HAS A PHYSICAL CONSTRUCTION SUCH THAT IT CAN BE MOUNTED ON TOP OF THE SYSTEM RACK WHICH CONTAINS A PLURALITY OF MODULES OF APPARATUS FOR ACCEPTING WATER OR STEAM SAMPLES FROM VARIOUS TEST POINTS IN THE POWER GENERATING SYSTEM, REDUCING THE PRESSURE AND TEMPERATURE THEREOF, DIRECTING AND METERING THE FLOW OF SAMPLES, AND PERFORMING ANALYSES FOR SUCH WATER CHARACTERISTIC AS PH, SPECIFIC OR CATION CONDUCTIVITY, DISSOLVED OXYGEN, SODIUM CONTENT AND THE LIKE. THE FACT THAT THE SINGLE SHELL HEAT EXCHANGER CAN BE MOUNTED ON TOP OF THE SYSTEM RACK AND THEREBY REPLACE A PLURALITY OF INDIVIDUALLY MANIFOLDED AND VALVED HEAT EXCHANGERS FORMERLY MOUNTED AT THE BACK OF THE RACK MAKES POSSIBLE A CONSIDERABLE SAVING IN COST, SPACE AND WEIGHT, A GREATER FLEXIBILITY IN SYSTEM LAYOUT DESIGN, TOGETHER WITH GREATLY IMPROVED ACCESS TO THE SYSTEM COMPONENTS FOR ADJUSTMENT AND MAINTENANCE PURPOSES, AND FASTER INSTRUMENT RESPONSE DUE TO SHORTER SAMPLE TUBING RUNS. THIS FLEXIBILITY OF DESIGN IN

THE MODULAR SYSTEM ALSO PERMITS THE SAME BASIC APPARATUS TO BE ADAPTED TO A LARGE VARIETY OF DIFFERENT SIZES AND TYPES OF POWER GENERATING PLANTS HAVING DIFFERENT ANALYSIS REQUIREMENTS THEREBY PROVIDING A CUSTOM INSTALLATION FOR EACH PLANT WHICH NONETHELESS RETAINS ALL OF THE ADVANTAGES OF STANDARDIZED DESIGN AND EQUIPMENT.

**EXEMPLARY CLAIMS** - Claim- 1. A WATER QUALITY ANALYSIS SYSTEM IN STEAM GENERATING PLANTS OF THE TYPE WHEREIN A PLURALITY OF WATER AND STEAM SAMPLES AT WIDELY VARYING INLET TEMPERATURES ARE REDUCED TO A COMMON LOWER TEMPERATURE RANGE SO THAT A PLURALITY OF SEPARATE ANALYSES MAY BE PERFORMED ON THE SAMPLES, SAID SYSTEM COMPRISING: ; A. A SYSTEM RACK HAVING A PLURALITY OF APPARATUS MODULES MOUNTED THEREIN, SAID MODULES COMPRISING AT LEAST A FIRST HIGH TEMPERATURE AND PRESSURE MODULE, A SECOND LOW TEMPERATURE AND PRESSURE MODULE, A THIRD STREAM SWITCHING AND FLOW METERING MODULE, AND AN ANALYSER MODULE CONTAINING APPARATUS FOR PERFORMING SAID PLURALITY OF ANALYSES, SAID SYSTEM RACK COMPRISING A RECTANGULAR BOX-LIKE FRAME HAVING PANELS MOUNTED ON THE FRONT THEREOF AND BEING OPEN AT THE BACK AND ENDS THEREOF TO AFFORD ACCESS TO THE APPARATUS OF SAID MODULES; ; B. A SINGLE CLOSED SHELL MULTICIRCUIT HEAT EXCHANGER MOUNTED ON TOP OF SAID SYSTEM RACK, SAID HEAT EXCHANGER HAVING A CLOSED PATH FOR PRESSURIZED COOLANT FLOW THERETHROUGH; ; C. A SINGLE COOLANT INLET MEANS AND A SINGLE COOLANT OUTLET MEANS EACH OPERATIVELY CONNECTED TO SAID SHELL; ; D. A PLURALITY OF PAIRS OF WATER AND STEAM SAMPLE CONDUCTING TUBES EXTENDING FROM SAID RACK MOUNTED MODULES INTO SAID HEAT EXCHANGER THROUGH ONE END THEREOF, ONE TUBE OF EACH PAIR BEING FOR SAMPLE INLET AND THE OTHER TUBE OF EACH PAIR BEING FOR SAMPLE OUTLET, SAID PAIR OF TUBES UNITING TO FORM A CONTINUOUS SAMPLE FLOW PATH WITHIN SAID HEAT EXCHANGER; AND ; E. MEANS OPERATIVELY ASSOCIATED WITH SAID HEAT EXCHANGER TO INDIVIDUALLY VARY THE RATE OF FLOW OF PRESSURIZED COOLANT PLACED IN HEAT EXCHANGE WITH EACH OF SAID SAMPLE FLOW PATHS FORMED BY SAID PAIRS OF SAMPLE TUBING IN SAID HEAT EXCHANGER SO THAT SAID SINGLE HOUSING MULTICIRCUIT HEAT EXCHANGER SIMULTANEOUSLY COOLS SAMPLES ENTERING IT AT WIDELY DIFFERENT INLET TEMPERATURES TO SUBSTANTIALLY THE SAME LOWER RANGE OF OUTLET TEMPERATURES.

NO-DESCRIPTORS .

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**46. STANDARD CONDUCTIVITY CELL FOR MEASUREMENT OF SEA WATER SALINITY AND TEMPERATURE**

PAT 00-00-75 03878456 NDN- 166-0044-8208-1

**INVENTOR(S)**- STEPHAN, FRANK H.; ELMIGER, ROBERT A.

**PATENT NUMBER**- 03878456

**PATENT APPLICATION NUMBER**- 404576

**DATE FILED**- 1973-10-09

**PATENT DATE**- 1975-04-15

**NUMBER OF CLAIMS- 7**

**EXEMPLARY CLAIMS- 1**

**FIGURES- 11**

**ART/GROUP UNIT- 258**

**PATENT CLASS- Invention (utility) patent**

**PATENT ASSIGNEE(S)- WESTINGHOUSE ELECTRIC CORPORATION**

**ASSIGNEE CITY- PITTSBURGH**

**ASSIGNEE STATE- PA**

**ATTORNEY, AGENT, OR FIRM- SCHRON, D.**

**U.S. PATENT CLASS- 3244480000**

**U.S. CLASSIFICATION REFS.- X204408000; X324433000; X374185000**

**INTERNATIONAL PATENT CLASS- G01N02742**

**PATENT REFERENCE(S)- 2330394**

**PATENT REFERENCED BY- 04320393**

A STANDARD CONDUCTIVITY CELL HAVING CONCENTRIC THIN-WALLED ALUMINA CYLINDERS OF DIFFERENT LENGTHS FOR EASE OF MANUFACTURE, WITH A THIN FILM OR LAYER OF STANDARD SEAWATER CONTAINED BETWEEN THEM. ELECTRICAL CONTACT IS MADE TO THE STANDARD SEAWATER BY END ELECTRODES AND A PRESSURE COMPENSATION ARRANGEMENT ALLOWS FOR THE CELL'S USE AT GREAT DEPTHS IN THE WATER. WITH A KNOWN RELATIONSHIP BETWEEN CONDUCTIVITY AND TEMPERATURE, THE CELL ALSO OPERATES AS A VERY RAPID TEMPERATURE SENSOR.

**EXEMPLARY CLAIMS -** Claim- 1. A STANDARD CELL COMPRISING: ; A. FIRST AND SECOND ELECTRICALLY INSULATIVE CYLINDRICAL MEMBERS, ONE DISPOSED WITHIN THE OTHER AND DEFINING A RELATIVELY THIN SPACE THEREBETWEEN; ; B. A THIN FILM OF A STANDARD SAMPLE OF ELECTRICALLY CONDUCTING LIQUID OF A KNOWN PREDETERMINED PARAMETER DISPOSED IN SAID SPACE AND HAVING A THICKNESS LESS THAN THE THICKNESS OF AT LEAST ONE OF SAID INSULATIVE CYLINDRICAL MEMBERS; AND ; C. FIRST AND SECOND ANNULAR ELECTRODES IN ELECTRICAL CONTACT WITH SAID STANDARD SAMPLE; ; D. THE INSIDE ONE OF SAID CYLINDRICAL MEMBERS EXTENDING THROUGH THE CENTRAL OPENING OF AT LEAST ONE OF SAID ANNULAR ELECTRODES; ; E. OPPOSITE ENDS OF THE OUTSIDE ONE OF SAID CYLINDRICAL MEMBERS TERMINATING WITHIN RESPECTIVE ONES OF SAID ANNULAR ELECTRODES; AND ; F. SEALING MEANS FOR CONTAINING SAID SAMPLE WITHIN SAID SPACE.

NO-DESCRIPTORS .

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